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REMINGTON & CO., 5, Arundel Street, Strand, W.C.

AN EXPOSITION
OF
ECONOMIC & FINANCIAL
SCIENCE,

Based upon a Cycle of Seasons in each Decade.

BY
WILLIAM MORTON HALBERT.

London :
REMINGTON AND CO.,
5, ARUNDEL STREET, STRAND, W.C.

1878.
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PREFACE.

AMONG the numerous works that have been published since the days of Adam Smith's "Wealth of Nations," there are none, on the above subject, that have attempted to give an exposition of the science based upon a Cycle of Seasons, in each decade, beginning on a specific, and ending on a definite year, making within this period a full decade of ten years, and thus, as it were, repeating the same or nearly a similar course each decade, thus forming a regular periodic Cycle of Seasons.

In treating the above sciences upon this principle, it renders them much more practical, more closely applicable to the real or

actual business of life; their truths are more readily apprehended or understood; they explain themselves under a more easily remembered formula.

The subject of a "Cycle of Seasons" has always been a trying if not a difficult one to work out by a statistical evolution. I am myself ashamed to acknowledge, after more than twenty years of thought, of labour, and almost endless correspondence upon this question, it is so very moderately advanced as yet in my hands; but upon it I could gain little assistance from my predecessors, nor much from my contemporaries. But from many scientific friends and correspondents I received an amount of encouragement to persevere I acknowledge with sincere gratitude, and tender to those of them now living my best thanks.

The question is, under my exposition, at

best only in a tentative state, but capable of being extended and turned to valuable account in the future development of economic and financial science. It may in time, in more able hands than mine, be the means of greatly advancing what is now considered the least progressive of all the sciences, throwing back much of the opprobrium, as it were, under which it rests.

The leading reviewers of the day now agree in calling it the "Dismal Science;" a very apt and expressive term, showing that some great factor, in its usual exposition, has been overlooked, or long ere this its position would have been far different.

This is now attempted to be supplied by dealing with it upon a "Cycle of Seasons," in each recurring decade, thus pointing clearly to the ruling of a great astronomical law in things mundane, whose ultimate dis-

covery and exposition is as yet beset with great difficulties to the best scientific men, but who are now pressing forward in this quest with an eager energy and zeal.

EXTRACTS.

The following are Extracts of Letters received as Remarks or Criticisms on short Preliminary Articles published on the subject in 1852, and also in 1866, now out of print; published in those years so as to secure the priority of the exposition of this subject :—

(1)—*Extract of Letter received from the late* SIR WILLIAM HAMILTON, BART., *Edinburgh University.*

I beg to return my best thanks for your able and only too favourable review of Dr. Thomas Reid's works, edited by me. It is an additional gratification to find that you are a friend of Mr. —, for whom I have long felt a high regard. Your separate article, just received, on the difficult question of a "Cycle of Seasons," &c., is most creditable to you, and will be found fruitful of great results, I trust, in your hands.

(Signed) ' WILLIAM HAMILTON.

(2)—*Extract from* GEORGE PATERSON, Esq., *Advocate and Author, Edinburgh.*

I note the question of Price. You treat it under the head of a "Cycle of Seasons;" and I was greatly pleased with the able and learned manner in which you deal with

it. It is undoubtedly a problem of no easy solution in Economic Science, and has, now that I think of it, been shamefully neglected. I hope you will go on and make it your own, even at the cost of time and labour.

(Signed) GEORGE PATERSON.

(3)—*Extract from* REV. J. ELDER CUMMING, D.D.

MY DEAR SIR,

I have not the slightest doubt that were these generalisations of yours, viz., "*Price versus a Cycle of Seasons*," to assume in your hands the complete form of scientific research, there is almost no part of business which might not derive more or less real benefit from them.

I think you should devote yourself to this question, as you have made a good commencement.

(Signed) J. ELDER CUMMING.

(4)—*Extract from* PROFESSOR A. H. CHARTERIS, D.D.,
Edinburgh University.

MY DEAR SIR,

Thanks for your interesting article. I am not a political economist myself, so I am not master of the important question you so ably discuss—so many cross and perplexing currents have met in it of late years. I hope you will continue those keen and penetrating observations of yours.

It is very likely all these things are under the rule of law, the discovery of which to you would be a great reward and satisfaction.

(Signed) A. H. CHARTERIS.

(5)—*Extract from the late* REV. THOMAS GUTHRIE, D.D.,
Edinburgh.

DEAR SIR,

I sent a note to my London friends, asking them to look at your MS. You should send it along with the note I enclose. The question is one of prime importance, and has been quite overlooked. Persevere and make it your own, as we are all dreadfully ignorant as to a "Cycle of Seasons," although we all of us talk about it.

(Signed) THOMAS GUTHRIE.

(6)—*Extract from* RIGHT HON. W. E. GLADSTONE, M.P.

11, Carlton House Terrace, May 21st, 1867.

Mr. GLADSTONE desires me to acknowledge the favour of your letter of the 18th instant. He is well aware of the great interest which attaches to the subject of Averages, upon which you are engaged, to solve the question of "Price *versus* a Cycle of Seasons;" but he regrets that he is unable to take any active part himself in the prosecution of it.

(Signed) W. H. GLADSTONE.

(7)—*Extract from* THOMAS CARLYLE, Esq.

5, Cheyne Row, Chelsea, January 23rd, 1871.

Mr. CARLYLE, my uncle, desires me to thank you for your note, which came to him to-day. Your subject may be, he thinks, very interesting; but his time is so much taken up otherwise, that he is quite unable to enter into it at present.

I return you the printed article, and also the letter of Mr. Gladstone's son, and with my uncle's best wishes for your enterprise,

I am, yours very truly,-

(Signed) MARY CARLYLE AITKEN.

(8)—*Copy of Letter from the* RIGHT HON. JOHN BRIGHT, M.P.,
dated

London, February 27th, 1875.

DEAR SIR,

I thank you for the printed letter you have sent me. The subject is one of great interest, and a work upon it, based upon a careful collection of facts, cannot fail to be of much value.

I am, truly yours,

(Signed) JOHN BRIGHT.

To Mr. MORTON HALBERT.

AN EXPOSITION OF ECONOMIC and FINANCIAL SCIENCE

Based upon a Cycle of Seasons in each Decade.

INTRODUCTORY AND PRELIMINARY REMARKS.

THE great difference that is found to exist in this country between practice on the one hand, and theory on the other, cannot be better illustrated in almost any department of human knowledge than is displayed in the subject of political economy, and, collaterally, in monetary science, when we consider them under the two-fold aspects which we have briefly indicated. In both walks of life—in commerce and in banking—we have first-class

men of great general ability, tact, and comprehensive intelligence, daily conversant with these vast outlying subjects; practically directing with success and prestige extensive affairs; almost never at a loss in the world of movement, and of action, possessing, likewise, great intuitive sagacity and shrewdness. Yet, inquire of these able and astute men of action in their moments of leisure and retirement to enter upon a discussion, either written or oral, of the theory of what is now called the "Principles of Political Economy," and not one in a dozen will be able to offer a valid or satisfactory explanation of those abstract principles of these very subjects that in practice they are acknowledged on all hands to be such masters and directors of in active life, or otherwise. They are unable to offer a clear and "sufficient reason" for the practical faith that is in them.

The question may well be asked, how it is that in a country devoting some of its best talent and ability in such pursuits, that practice is held to be everything ; and that science, as the generalised or systematised law of such practice is held so loosely that few men can give a clear and valid exposition as to the art they daily practice in the diurnal routine of commercial or of banking affairs.

An explanation for such a state of things (in part at least) is not very far to seek. Let us, in the first place, follow the career of a youth whose inclinations, parents or guardians, propose devoting him to a commercial or banking training, having acquired an education of ordinary equipment, with a few years at the classics, and one or two modern languages. He is entered in a commercial or banking office to learn the practical routine of mere transactions, to seek out, as it were,

from such details, the overruling principles that guide such business practically. He pursues this avocation without any previous study or training in the abstract principles of political economics or monetary science. Once this ideal youth is afloat in real work, his taste, his inclination is more and more averse to any dry and technical study or hard reading upon the above subjects; nay, even if he enters upon them in his leisure the want of apparent bearing upon commercial or banking affairs seems so remote, so inapplicable, that his interest flags in this pursuit, and loss of perseverance for scientific or systematic study is seldom in after life made up to him. The great inducement for "light reading" now held out—reading for mere amusement or relaxation—so incapacitates the mind usually for severe, sober and continuous thought in almost any science or study which does not

present absorbing attractions in the way of vivid illustrations or vital discoveries, that the subject, as a course of private study, is abandoned altogether ; so much, then, speaking generally as regards our younger friends (of course with many individual exceptions).

Let us now turn to speak in general terms of the authors of those authorities who propound the principles of the science in question. The conception and subsequent development of it as a distinct branch of abstract science is of modern date, " but its subject (matter) has, in all ages, of necessity constituted one of the chief practical and absorbing interests of mankind." That subject is wealth. Writers on this subject teach the laws, abstractly considered, with concrete examples or illustrations, how wealth is both individually and nationally produced or developed with the collateral laws of its distribution

as well as the laws under which at certain periods it is either destroyed, lost, or placed beyond productive use, or average increase.

We shall now examine somewhat in detail as to the method or *modus operandi* by which the writers on political economy, speaking generally, have explicated the results of their researches and investigations, and given them forth to the world, without almost an exception. They have in general adopted the deductive method for expounding their principles, or by giving a general abstract theorem (or proposition) to begin with; they proceed to support this by ample concrete illustrations or developments of what this general abstract theorem contains or is contained under it in their own view or opinion or borrowed from some antecedent authority; or otherwise they assume a theory as an expression for a

general law of nature, and in scientific nomenclature, they analyse (or resolve) this law, or compounded theory or theorem into its elementary parts or details; and so great are the analytic powers of the most recent master of this method that he analyzes some of his theorems into vanishing fractions. This will be found stated in James Stuart Mills' sixth edition of his recent work, "Principles of Political Economy," where under the "Theorem of Labour as an Agent of Production," he says (page 19)—"To estimate, therefore, the labour of which any given commodity is the result, is far from a simple operation. The items in the calculation are very numerous, as it may seem to some persons, infinitely so After mounting one or two steps in this ascending scale, we come into a region of fractions too minute for calculation."

In this method we have an explanation, in part at least, as to the slow, tedious, and uncertain growth of the science, and its great want of interest as a systematic study by minds of great mental power and activity ; so much is this the actual case, that some of the leading reviewers of the present day very aptly and appropriately call it the Dismal Science ; and we must acknowledge it has done much to attain to this melancholy pre-eminence. The method of treating it deductively appears to have been borrowed from the mathematical sciences instead of attempting its exposition by the rules of inductive reasoning, as laid down by Lord Bacon—whose rules of induction have been those employed in the successful and progressive development of modern science, and borne such valuable and far-reaching practical results therein.

For the purpose of explicitly illustrating

the different methods of deductive and inductive treatment and development of scientific truth, we cannot do better than give a pretty full quotation from the writings of the late Sir William Hamilton, in his "Discussions on the Higher Philosophy," where he contrasts the dissimilar methods pursued in the Mathematical *versus* the Philosophical Sciences (*i.e.* the Mental Sciences).

From his work, first edition, pages 272 and 273, we quote as follows, viz., "Mathematical Study as Unimproving :"—"How opposite are the habitudes of mind which the study of the mathematical and the study of the philosophical sciences require and cultivate, has attracted the attention of observers from the most ancient times. The principle of this contrast lies in their different objects and their different ends, and in the different modes of considering their objects ; differences in the sciences them-

selves which, calling forth in their cultivators, different faculties, or the same faculty in different ways and degrees, determine developments of thought so dissimilar that in the same individual a capacity for the one class of sciences has, not without reason, been considered as detracting from his qualification for the other."

"*As to their objects.*—In the first place, mathematical sciences are limited to the relations of quantity alone, or to speak more correctly, to the one relation of quantities—equality and inequality; the philosophical sciences, on the contrary, are restricted to none of the categories, are co-extensive with existence and its modes, and circumscribed only by the capacity of the human intellect itself. In the second place, mathematics take no account of things, but are conversant solely about certain images, and

their whole science is contained in the separation, conjunction, and comparison of these. Philosophy, on the other hand, is mainly occupied with realities; it is the science of a real existence, not merely an imagined existence.

“*As to their ends, and their procedure to these ends.*—Truth or knowledge is, indeed, the scope of both, but the kind of knowledge proposed by the one is different from that proposed by the other. In mathematics, the whole principles are given; in philosophy, the greater number are to be sought out and established. In mathematics, the given principles are both material and formal; that is, they afford at once the conditions of the construction of the science, and of our knowledge of that construction. In philosophy, the given are only formal—only the logical conditions of the abstract possibility of

knowledge. In mathematics, the whole science is virtually contained in its data ; it is only the evolution of a potential knowledge into an actual, and its procedure is merely explicative. In philosophy, the science is not contained in data ; its principles are merely the rules of our conduct in the quest, in the proof, in the arrangement of knowledge ; it is a transition from absolute ignorance to science, and its procedure is, therefore, ampliative. In mathematics we always depart from the definition : in philosophy, with the definition we usually end. Mathematics know nothing of causes ; the research of causes is philosophy. The truth of mathematics is the harmony of thought and thought ; the truth of philosophy is the harmony of thought and existence. Hence the absurdity of all applications of the mathematical method to philosophy.

“ From this general contrast it will easily be seen how an excessive study of the mathematical sciences not only does not prepare, but absolutely incapacitates the mind for those intellectual energies which philosophy and life require. We are thus disqualified for observation, either internal or external, for abstraction and generalisation, and for common reasoning ; nay, disposed to the alternative of blind credulity, or of irrational scepticism. Mathematical demonstration is solely occupied in deducing conclusions in a long chain of reasoning which descends with adamantine necessity, link by link, in one simple series from its original dependence. In general *inductive* reasoning the capacities mainly requisite and mainly cultivated are the prompt acuteness which discovers what materials are wanted for our premises, and the activity, knowledge, sagacity and research

able competently to supply them. Of observation, experiment, *induction*, analogy, the mathematician knows nothing.”

The above quotation, clear and explicit as it is, does not by any means exhaust the full meaning of the terms Deductive *versus* Inductive method of searching for truth and seeking, when it is found, to expound and establish it as a general law in the nature of things.

Man is aptly termed, “in his highest mental efforts, a hunter of truth” and knowledge. In this quest, it is of the utmost importance that those who may have succeeded in satisfying themselves that they have laid hold of a truth in any branch of science, should adopt the best and most interesting mode of expounding the same.

We intend, therefore, so far as possible, to follow out in our exposition of the subject

the inductive method of treatment which may thus be generally indicated, as that, from a vast number of particular facts and observations collected, arranged, and systematised upon a preconceived theory, a general law can by inductive generalisation be arrived at that binds those facts and observations together; or, under the condition of a general principle, that can be easily apprehended and recalled by the memory.

It is well remarked, on a kindred subject, by Sir William Hamilton, in a review of Dr. Cullen's life and labours as a medical reformationist :—

“Individual appearances are of interest only as they represent a general law. What Cullen did it required individual ability and genius to do. It required, in its highest intensity, the highest faculty of mind, that of tracing the analogy of unconnected obser-

vations, of evolving from the multitude of particular facts a common principle, the detection of which might recall them from confusion to system, from incomprehensibility to science.

“The only speculation he recognised as legitimate was induction. To him theory was only the expression of a universal fact, and in rising to this fact no one with equal consciousness of power was ever more cautious of the different steps of his generalisation.”

CHAPTER I.

THE ECONOMISTS, THEIR WORKS AND LABOURS.

THE honour of being the real founder of the modern system of political economy, at least in this country, is undoubtedly due to Adam Smith, who was born in Kirkaldy, on the 5th of June, 1723. He was entered in the Glasgow University in 1737; three years after he entered as an exhibitioner on Snell's foundation (or scholarship), Baliol College, Oxford. In 1751 he was elected Professor of Logic in his *Alma Mater*, and in the following year to the chair of Moral Philosophy.

After long thought and meditation, with a vast accumulation of information, Dr. Adam Smith published his celebrated work "An

Enquiry into the Nature and Causes of the Wealth of Nations." The first edition came out in 1776; the fourth and last edition appeared in 1780. The author died in Edinburgh in July, 1790.

This work, the "Wealth of Nations," has done for political economy what Dr. Thomas Reid's philosophic works have done for the science of mind and the modern development of the higher philosophy, creating a revolution therein.

To Adam Smith belongs the great merit of being among the first to advocate the doctrine of the freedom of trade, and the doing away with all the restrictions that hampered commercial intercourse between nations.

In this respect, and on this topic, the closet theories and speculations of this illustrious thinker have had the rare merit of being the battle-ground of rival and contending parties

in the councils of State, and are now happily embodied in our legal enactments, declaring a wide and lasting freedom of trade and commerce, which other nations are still slow to follow and adopt.

The great merits of Adam Smith in this respect should not blind us to certain defects in his mode of expounding the general principles of economic science, which are those of deductive reasoning, very much borrowed from a mathematical style of exposition, and what is not to be much wondered at, is that most of his followers, and many subsequent authors on this subject, have followed the founder of this science; one example of which is in John Stuart Mill's recent publication on the "Principles of Political Economy," a very able, elaborate, and exhaustive work, which we shall refer to further on.

For a general view of the principal merits and defects of Smith's "Wealth of Nations," we refer to the introductory discourse of the late Dr. J. R. McCulloch. Among one of the most learned and able of our recent economists, he has edited the works of Adam Smith. He very justly remarks, "that considerable diversity of opinion has been expressed as to Smith's claim to originality." There can be no doubt he made a free and a valuable use of the previous labours and works of the Italian, but more particularly the French school of economists. While, however, he did so, he gave the world the result of his own opinions, making many of their views and opinions his own, unexclusively his own, by his profound and continuous thought and labour upon them.

The great and signal characteristic of Adam Smith's genius was that he was able

by its power to project himself into future times—to live, as it were, far in advance of his age—to shape a large share of the world's future life and action by the silent, solitary force of his own continuous thought upon those problems that arise ever and anon for discussion, elucidation, or compromise in all stages and states of society.

Tried by the one test of being far in advance of the age he lived in, Adam Smith stands almost pre-eminent and alone among all modern economists. The test is, indeed, a valid one, for to few, alas! too few, are given that prophetic glance that scans the future age, and determines by the energy of solitary thought speculations that a future generation will welcome “familiar as household words.” Indeed to the possessor it is generally a perilous gift; for just in proportion as a thinker and author is in advance of his

age, is his neglect, generally speaking, by his contemporaries; but this neglect is to minds of a high order the bracing of a northern climate—it oft-times is the one thing needed to bring out all their energies; to it and its attendant adverse circumstances we owe many of the greatest achievements of human effort. Happily Adam Smith had not to suffer in his day this trying neglect—to be known only when he was in his tomb. He, fortunately, was greatly and thoroughly appreciated by his eminent contemporaries alike in Scotland and in the literary and scientific circles of London and Paris. He was no scientific or philosophic recluse; he was quite a man of the world and of society.

In his day, when he was in the full possession of his rare and distinguishing powers, there occurred a great outcome and development of brilliant philosophic and scientific

energy and thought. Dr. Thomas Reid was laying deep the foundations of that school of the higher metaphysics (a recoil from Hume and Kant's specious but sceptical doctrines) that has borne such invaluable development in the life and labours of Dugald Stewart and Sir William Hamilton.

Dr. Cullen was working out a revolution and a *reform* in medicine equal to the one Dr. Joseph Black was effecting in chemical science, owing to his great discovery of latent heat, which, in the hands of James Watt, established the steam engine as the greatest motive power of modern times.

Such, then, in brief, were the days and thinkers and men of science among whom Adam Smith lived and died. He was truly great among the greatest of them; could hold his own in all the discussions and conferences of such brilliant men and scholars—

himself an ornament to any such society. Little wonder then that he has exercised such long-continued sway over the science he so perseveringly cultivated. Truly of him we may say—

“The great of old, they rule us from their urns;”

they teach us that the only immortality man can know on earth is given to him who bequeaths to mankind the rich legacy of imperishable thought and ideas.

The science thus inaugurated by Adam Smith, we need not repeat, has had, since his day, numerous expositors, authors, and others who have cultivated it with great industry and assiduity. If we pass over the many without further notice, it is not because they have been unstudied, or unread; but for the direct purpose we have in view it would lead us far beyond the scope

of our present enquiry to notice them in detail.

Our numerous class of statesmen, legislators and journalists, are many of them most accomplished and deeply read political economists, and analyse with keen and searching criticism the various doctrines of the science that from day to day come up for elucidation and discussion.

Among the more recent works we require to notice, and we regret briefly, is John Stuart Mill's contribution, a work that seeks to bring up the subject from the time of Adam Smith to the present day, as thus stated.

Mr. Mill says :—" It appears to the present writer, that a work similar in its object and general conception to that of Adam Smith's, but adapted to the more extended knowledge and improved ideas of the present age, is the

kind of contribution which Political Economy at present requires. The 'Wealth of Nations' is in many parts obsolete, and in all imperfect. Political Economy, properly so called, has grown up almost from infancy since the time of Adam Smith, and the philosophy of society, from which practically that eminent thinker never separated his more peculiar theme, though still in a very early stage of progress, has advanced many steps beyond the point at which he left it."

This then is the idea or plan upon which Mr. John Stuart Mill has carried out his celebrated work. He has sought as it were "to complete the discussion of the many complex problems" with which the science is invested; to do this also with all the light and aid shed upon them by modern investigation and discussions into our social science philosophy of the present day. No

one can but admire the ability, skill, and rare industry which Mr. Mill brings to bear upon the task he has set himself to do; his erudition on the subject is equally profound and extensive. The principles are fairly stated, are supported with numerous, nay exhaustive deductions and illustrations; but it is in this very plan of treatment that we think Mr. Mill has made a mistake: he has almost everywhere treated it in a mathematical style of reasoning, *i.e.*, the *deductive* instead of the *inductive* mode. He propounds his leading principles under the different heads of his subject, then analyses the abstract proposition into its component parts, or from it makes the deductions in support of his foregone proposition.

Admirable as the work is in many different respects to spread abroad and extend a knowledge of the subject, we much question

if it possesses that inherent power to advance the science by new and progressive truths ; for in such branches of enquiry it is one thing to extend, but quite a different, and far more difficult thing to advance knowledge, which if not kept onward in an advancing state, ceases to yield improvement.

While our author under review is eminent as a writer, full up to the level of his own day, we fail to trace any indication of his ideas being at all in advance of his age in which he lives, in this respect forming a marked contrast to his great prototype Adam Smith.

Mr. Mills' tendency in most of his reasoning to ultimate his principles, even unto the uttermost, gives an air of paradox to his writings and orations which detracts much from their validity ; moreover, instead of fully stating his principles with a brief and

pertinent application—thereby suggesting trains of thought to his more attentive and acute readers, teaching them to think out the results for themselves—he overloads them with illustrations, details, &c., that any one could apply for himself: thus he overpowers the memory, confusing the understanding, if not indeed paralysing all free and energetic thought itself on the part of those who seek improvement and progress from his teaching and writings.

Mr. Mill is a follower and great admirer of Bentham and of the Utilitarian school; he is one, too, who holds by a mere philosophy of experience, instead of the now well ascertained and established fundamental truths of the higher philosophy, held by the great majority of scientific and philosophic thinkers and writers. On this subject he has recently made a fierce and vehement attack, which

has been ably and successfully answered by those fully able and competent to do so.

That we have not overstated Mr. Mill's predilection for a deductive mode of treatment generally of his subject, or his leaning to a mathematical style of reasoning, the following extract will show :—

“ The three preceding parts include, as detailed a view, as our limits permit, of what by a happy generalisation of a mathematical phrase has been called the statics of the subject: *i.e.* the economical laws of a stationary and unchanging society. We have to consider what these changes are, what are their laws and what their ultimate tendencies, thereby adding a theory of motion to our theory of equilibrium ; the dynamics of Political Economy to the statics.” (Book IV. page 421, sixth edition.)

We consider these terms as inapplicable to

the science as at present existing, as being very far behind in its progress, before it ever can enter upon a mathematical formula and treatment.

The only mode in which it can enter upon so advanced a stage of precision and certainty would be the systematic arrangement of its statistics as averages upon a preconceived plan or theory, thus showing out a (mean) numerical law, in its all embracing nature, in any one branch of the subject; were this successfully done, then, and then only, could a mathematical formula and reasoning become strictly applicable. Strange as it may appear, this has not been attempted for the more vital parts of it.

It is to this task we intend to devote our efforts in what follows, endeavouring to give a general exposition of it rather than one more technical, still as scientific as can be,

because our aim will be to render it more suitable and popular to the many than appreciated only by the few ; for should we succeed in this, it will be found we think to have a direct and practical bearing on the great business of life and action, in this respect well deserving of a fair attention and study.

In what follows, we have no intention of keeping closely to the usual prescribed form of tracing out "Political Economy" from its early first dawn, or what may be called its historical progress. This has been so amply done by Adam Smith and many other writers, that we would be only going over ground well cultivated by others ; moreover, we intend, so far as this can be done, to leave out of view and consideration the "Political Element," confining ourselves to the "Monetary and Economic" branch alone, and to such laws as we can trace therein.

CHAPTER II.

SUMMARY OF DOCTRINES ON PRODUCTION, EX-
CHANGE, VALUE, AND PRICE.

As to production, the prime or principle requisities are two—labour and appropriate natural objects, upon which labour or human exertion can be expended or invested therein.

“Labour is either bodily or mental, either muscular or nervous,” and is more often compounded of both ; labour in the physical world is always, if not solely, employed in putting objects in motion. Most natural objects have themselves been impressed with the laws of motion or certain powers of motion, either latent or visible ; and man’s labour and skill is to take full and free ad-

vantage of these by suitable and appropriate adjustments, or what Dr. Chalmers calls "the allocation of matter or material objects." Thus man seeks or evokes their aid and conjunction with, and by, his own efforts towards production, either by moving material to where a natural increase is given by the laws of development, or giving the said object a higher condition or value, either by a manufacturing, a purifying, or refining process. Nature gives us her general products in most cases in a crude or impure state. Labour is expended or invested productively in removing these impurities, so that the foundation of the value of a natural object, for which a demand exists, is the pure state in which it is either found or produced, or converted and raised by labour to this state of pureness, or approaching thereto, rendering it fit for the use, the want, or the desires of man. So far

as known to us, this doctrine of purity in production is, for the first time, stated here as a factor in the denomination of value. It would require a treatise by itself for its full elucidation, while we can only allude to it in passing, and that very briefly.

It must be borne in mind that man's power in production, though extensive and everywhere enlarging, is yet limited. He has no power whatever to create in any sense a material object, or any part thereof; neither can he indeed destroy a single iota of matter, which is indestructible by any of man's efforts, which are limited to an extractive and formative industry thereon. He can effect great and valuable changes on it; he can add to, compound, or abstract certain qualities, or mould it into certain conditions or forms, always, however, of some pre-existing type or combination of antecedent forms, as man cannot

create a new form or type in material or physical existence. He cannot even do this in thought itself, even by the greatest effort of imagination, or any other faculty of mind.

The difference between what is produced and what is consumed, provided a surplus is set aside, or free for future use, this surplus, when accumulated into stock, is justly called capital. The past product of unconsumed but accumulated labour is fitted to aid a present labour; available and active to set up labour and industry in organised motion upon natural and appropriate objects, with the end in view of a further accumulation of capital, which has usually been divided into circulating and fixed capital; the former being engaged in carrying on the motion and movements of commercial exchange, the latter fixed in the buildings, factories, docks, railways, &c., of our present developments,

although even part of this re-appears in time as floating or circulating capital.

It is in this ceaseless motion, and these perpetual movements of commercial exchange—Nature and man being as it were in conjunction to carry them on—that we have the three great cognate branches of our subject—the Science of Exchange, the Theory of Value, and the Theory of Price.

The word value always means value in exchange, although there is a “value in use,” equally valid. Exchange value requires to be distinguished from price, which has been employed to express the value of a thing or commodity in relation to money. By the price of a thing we shall understand its value in a money denominator—value is a relative term. The value of a thing means the quantity of some other thing that exchanges for it.

The temporary or market value of a thing or commodity is regulated according to the supply and demand, or is thus styled the “higgling of the market,” to fix or find for it a settling price. Besides this, most things or staple commodities have a natural value, or what we would call an average value, not only annually, but extending over a series of years, into which varied elements may or may not enter—such as wages, labour, rent, profit—in all costs of production. Or otherwise, a capitalist, not using his own accumulated or inherited funds, may loan out his money to others at a fixed on rate of annual interest, or at the market rate of the day.

This brings us to the consideration of the subject, money, and the functions it performs in our enquiry, which is indeed one of the most vital parts of our exposition. All our previous remarks, we regret very briefly and

concisely given, are intended merely as somewhat preliminary on this subject.

In all civilised countries the mutual interchange of commodities is carried on by the use of what is usually termed a medium of exchange, or a circulating medium, which may be considered as equivalent to the term money ; while on the one hand it facilitates exchange, inland and internationally, on the other a permanent and fixed standard of ordinary value to be a relative measure of value to things or commodities of a different kind.

By an almost universal concurrence, almost all nations, from the earliest times even, fixed upon certain metals, and especially gold and silver, to serve the purpose of a circulating medium, to be in a sense, a measure or standard by which relatively to measure other things provided for by an agreed upon

standard of purity, and value, at the par of exchange, was fixed on and regulated by either written or common law, or usage of trade.

When gold and silver had thus become virtually a medium of exchange, the advantage of coining easily suggested itself. "It became the duty of every properly regulated government to take the charge of coinage into its own hands," to save the community the trouble of weighing and assaying at every exchange or transaction.

Thus, although money, *i.e.* gold and silver coins, are thus regulated as denominators of a standard value by Government mark and superscription, money is still a commodity. "Its value is therefore regulated like that of all other general commodities, temporarily by supply and demand;" permanently and on the average, by cost of production. This brings us to consider the value of money;

for, while it acts as a standard of value to compute other things by, it has a variable and fluctuating value itself, which oscillates between a maximum on the one hand and a minimum on the other, determined, like other things, by supply and demand; or otherwise, by the amount of money to lend, the number of lenders *versus* the number of borrowers, amount required, the security offered, the state generally of credit, &c. What is really lent is capital, although the transfer of this is effected by the instrumentality of money.

“The amount of capital passes from the lender by means of money or an order or credit to receive money. It is in money value the rate of payment, for its use is computed at so much per centage per annum.”

In this manner capital is universally called borrowing money. “This loan market is

therefore called the Money Market." Those who have their capital in hand disposable for investment or loan are called the monied class. "The equivalent given for the use of capital is called the interest, but more frequently, by a perversion of terms, is called the value of money."

"The functions performed by credit have been generally misunderstood." Although at all times great and important in a commercial trading community, they are not magical. They cannot create, *i.e.* produce a something out of nothing, although many individual cases occur of those who, commencing with nothing but character and skill, have emerged into the monied class after years of steady toil.

Credit, in its simplest form, and in its practical use, as applied to our present subject, is a transfer of capital from one disposed

to lend and to another desirous of borrowing, for a certain time and upon a certain percentage for interest. But credit has many more complex forms and conditions than the above to prevent the transfer of bullion, or gold and silver coin, from place to place, either within a country or internationally. Bills of Exchange is an extensive form credit has assumed. Another form is the inland or home bill or promissory note, to delay or extend the time of payment into future dates, ranging from one or two up to six months. A greatly increasing form is now cheques on bankers, and the most important is the bank note, payable on demand, and at the option of the holder convertible into its equivalent in gold coin, and in this form are most valid instruments in a well-regulated currency, saving the use, the tear, and wear, and risk of transferring large sums in coin or bullion.

All these and other forms of credit are based upon faith and confidence; a tacit but well-understood contract between the parties interested.

In all these forms of credit, multitudinous as they may be, and however secure they seem, either for immediate or deferred payment, extending into future time, they are subject to great and overpowering fluctuations, working out more good, and, at times, more evil, in any commonwealth than almost any other tangible cause that can be named.

Complex as the enquiry into such a cause or con-causes must necessarily be as the oscillations of so mutable a thing as credit must be, ever oscillating between a positive and a negative pole, or from a maximum to a minimum state or condition; still, it is principally into this question we wish to enter

upon, and, if it is possible, give an exposition on this part of our subject, endeavouring to give an outline of those laws under which these phases appear as applicable to all time.

CHAPTER III.

THE LAW OF PERIODICITY OF EVENTS IN FINANCIAL AFFAIRS.

THE present time is, we think, favourable to enter upon the consideration of what is usually called Monetary, or Financial Science. In regard to that part of it, banking and currency, we have long held the opinion that any enquiry into this branch of it should be preceded by an enquiry pursued on scientific principles into the subject of financial crises and panics. It has been usual to attribute these monetary occurrences to defective laws and regulations on banking and currency, and the endeavour has often been made to account for them by tracing out such defects.

as are most apparent in the laws and regulations that control the currency of this or other countries. While we do not doubt this may be true, in part at least, the causes that produce monetary or financial crises and panics lie far deeper in the nature of things for to be explained by any such partial views as have hitherto been put forth for their explanation and solution.

What we propose, therefore, as our object, is to first enquire into the question of monetary crises and panics, and this upon what may be deemed scientific grounds. By this proceeding, we shall endeavour to trace out from the nature of things those higher laws that control and determine these disturbances in the monetary markets of this and other countries.

It is well known to those who have studied this subject that a crisis may arise in monetary

affairs without producing a panic, while a financial panic never occurs without developing a crisis. Panics are generally, if not invariably, periodic, and recur at definite and well-marked intervals of time. In other words, their appearance and powers are experienced by us in a cycle of years. Thus, from past experience, we may justly conclude that being periodic in their nature, crises and panics are natural phenomena. It becomes, therefore, all the more important for financial or monetary science to explain and expound such, on rational principles, applicable alike to this and other subjects that fall within scientific treatment. If we can succeed in this, there arises the well-grounded hope that in evolving the higher laws that control and determine the occurrence of monetary panics, science will be found to be true to her vocation in being able to predict or forecast the on-com-

ing or advent of such dire financial disasters, thus giving timely warning to those most exposed to their consequence, and avert, in part at least, the ruin and disaster they occasion.

This hope in which we indulge would, we fear, be vain if we did not enter upon this part of the enquiry in the full confidence of being able to bring the subject of which we treat within the "reign of law." And here we cannot do better than quote the words of the Duke of Argyll, where he says :—" What, then, is the reign of law ? What is law ? and in what sense can it be said to reign ? The laws of nature are simply those facts of nature which recur according to a rule, so as to involve the idea of obedience to a force. This idea of force is essential to the true conception of law. The word is no doubt often very loosely used, but it involves a great deal more than merely ' an observed order of facts.'

The order must be so constant and so uniform as to indicate necessity, that is, the action of a compelling force. When the operations of such force can be reduced to a rule, this rule is itself called the law; and when such rules are so definite as to be capable of mathematical expression and mathematical proof they are in the nature of pure truth.

“The discovery of them is the great quest of science, and the finding of them is her great reward. Such laws yield to the human mind a peculiar delight from the satisfaction they afford to those special faculties whose function it is to recognise the beauty of numerical relations. This satisfaction is so great, and in its own measure is so complete, that the mind reposes on an ascertained law as on an ultimate truth.”

It is, therefore, in the spirit and scope of

the above remarks we pursue our enquiry, in the first place, into the phenomenon of the periodicity of financial crises and panics. These events have hitherto been known and experienced under such conditions in the past, and there exists strong evidence in our researches to anticipate that in the future they will appear under the same conditions of periodicity as they have hitherto done. It is by giving this fact its due prominence that we shall be the better able to seize upon the general and special conditions that determine this law of periodicity. It is well known that by the study of the periodical movements of the solar system, and the laws deduced therefrom, that the science of astronomy has arrived at such perfection, as not only to predict these movements far in advance, but to be considered as one of the most perfect of the sciences.

Strange it is, that one of the most distant of our sciences should be the most advanced, while the one that comes home the nearest to man and his daily interests, viz., financial science, should be the most neglected, or the worst understood or developed, although as a practical art it flourishes in a high state. But such is the case, and it has its counterpart or parallel in the science of physiology. It is well remarked by the late Sir William Hamilton, in his review of Dr. Cullen's works, "That of all subjects of scientific interest, men in general seem to have the weakest curiosity in regard to the functions of their own minds and even bodies. So it is now, and however marvellous, so has it always been. For one amateur physiologist we meet a hundred dilettanti chemists and botanists, and mineralogists and geologists."

So likewise is it in the science we desire to

treat. It has been studied not as a science, but cultivated as an art, in many cases more as a trade. It has, therefore, not been investigated upon the principles we deem necessary for its true and full elucidation. But nevertheless it has been assiduously cultivated as an art and as a trade, and the daily close observation of monetary affairs by skilled and experienced financiers has resulted in the ability and shrewdness to read the future movements of our monetary markets, somewhat in advance of the prospective change ; in this respect these changes may be looked upon as somewhat analogous to the ebbing and flowing of the tides, having their spring and their neap tides at regular or irregular intervals of time. While these short-dated observations are truly invaluable as a guide in all financial operations, they fail to afford any real or tangible insight into

the sweep and control of those higher laws that rule the ebb and flow of those monetary tides we have alluded to, or fail to throw sufficient light on the law of periodicity in financial affairs.

It may here be objected that the exceeding complexity of the problem thus adopted for solution will render a scientific treatment of it nearly impossible, or any practical result therefrom inoperative, if not otherwise unsatisfactory, and, like meteorology, incapable of making any "forecasts" beyond a few days in advance, an exceedingly problematical matter. On this point we quote from Sir John F. W. Herschell's remarks on meteorology :—" It is to be borne in mind, however, most carefully, that all such indications are to be received as valid (*pro tanto*) only for a very brief interval in advance, and that the 'weather prophet' who ventures his pre-

dictions on a great scale is altogether to be distrusted. The physical laws that determine the 'various and mutable things which we call the weather,' are so numerous and complex, and the results in consequence so mutually interwoven, and the *momentary* conditions of their action so dependent on the state of things induced by their previous agency, that it is no wonder it should be next to impossible to trace each specific cause direct to its present effect."

It is not very encouraging to our enquiry, to read the above remarks on meteorology and that branch of it "Weather and its Forecasts"—this, too, from one of its most distinguished cultivators—for our subject presents many analogous features, in "numerous and complex results" in "*momentary* conditions," and "their action so dependent on the state of things, induced by previous agency,"

&c. Although we well know the subject is beset with difficulties, still we are encouraged to persevere, and the more so, from the remarks of the same distinguished philosopher, where he elsewhere says :—"If we are ever to make any material progress in the prediction of the weather, beyond 'forecasts' of a few hours, or it may be a whole day in advance, it can only be by the continued study of such of its 'phases as recur periodically,' or of such as manifest 'a periodicity of event,' as distinct from that of times and seasons, with a view to connecting them with their efficient physical causes. Of this latter description we have an example of one, and of its successful reduction under the domain of philosophical reasoning in the law of the rotation of the winds."

Likewise we have the observation on periodicity made by Dr. James McCosh,

which we gladly quote :—“ We find all leading events in the earth and heavens to run in periods. Plants have their seasons for budding, for growing, for bearing seed and fruit, and their whole existence is for an allotted time. The life of animals, and of man himself, is a period, and it has its periodic developments of infancy, of youth, of manhood, and old age. The very diseases of the human frame have their periods and crises. The events of history in respect of politics, civilisation, science, literature and religion can be arranged into cycles, and as a whole, exhibit a regular, though a somewhat complex progression. The tides of the ocean and, in many places, the currents flow in periods, and in some countries the winds blow and the rain falls at certain regular seasons ; the variations of magnetism on the earth's surface seem to be periodical. The

year is a period, and it has its annual seasons and there are *magni anni* (a great year) in the movement of the planets round the sun."

It would be easy to multiply quotations of a similar or kindred nature from the most eminent scientific writers, some of which arise to our remembrance, where Alexander Von Humboldt says :—

" In reflecting upon physical phenomena and events, and tracing their causes by the process of reason, we become more and more convinced of the truth of the ancient doctrine, that the forces inherent in matter and those which govern the moral world exercise their action under the control of primordial necessity, and in accordance with movements occurring 'periodically,' after longer or shorter intervals. It is this 'primordial necessity, this occult (hidden) but permanent connection, this *periodical* recurrence in the progressive

development of forms, phenomena and events which constitute nature, obedient to the first impulse imparted to it. . . . The ultimate object of the experimental sciences is therefore to discover laws and to trace their progressive generalisation."

Lord Neaves in a recent lecture says likewise : "I may express my belief that it seems to be a part of the Divine plan not altogether to trust for discovery to ordinary or average men. But from time to time to send into the world men of exceptional powers, possessed of transcendant faculties of observation, of inference, and of invention who have been able, each of them, within the limits of a *short* life, and in face of *tremendous* and overwhelming *difficulties*, to make advances in knowledge and scientific discovery which ordinary men could not have accomplished through many ages. But just

as I consider our ordinary powers to be the gift of God and to be exceedingly good, I consider the 'periodical production' of great philosophers and men of science to be the gift of God also, and to be one which we ought to receive with gratitude and reverence, and the men who are sent to teach us science, a knowledge of physical laws, are apostles of truth in their own sphere."

CHAPTER IV.

CAPITAL CURRENCY IN BANKING.

WHEN the late Sir Robert Peel introduced and carried his celebrated English Bank Act of 1844, it was well known he was the only Minister capable of entering upon such discussions necessary to carry out such a measure. At that time the abstract principles of currency and banking had not been studied by any great number of individuals, and the late distinguished Baronet was the greatest living authority thereon.

The case is now different, and when the subject of the Bank Act of 1844 comes again before the country, if the abstract principles are not yet sufficiently considered and studied

a vast body of the practical experience of its action has been accumulated, capable of being embodied into sound and lasting working principles of legislation.

The late Sir Robert Peel was, perhaps, one of the greatest financialists that, as a Minister, ever held the reins of power, and was a complete master of the subject at that time in all its bearings. Nor was this to be wondered at. He was born to great advantages. His father, a man of great shrewdness and sagacity, had him carefully trained. Besides being a fair classical and mathematical scholar, he was early versed in commercial and financial principles. Himself an extensive capitalist by inheritance, he improved, instead of wasting, his patrimony by judicious investments. Taken as a whole, the late Sir Robert was admirably qualified for the part he was called on to fulfil. Of a gentle-

manly and commanding presence, gifted with a ready and powerful eloquence, equally at home in exposition, in attack, in argument, and in debate, he was a Statesman of no ordinary qualifications, both natural and acquired.

That he was wanting in those elements of thought that go to form a great and lofty mind, was well known and apparent. He was not much in advance of his age, and was forced, in many cases, to carry out other men's ideas rather than his own. In this way his reputation for sincerity was always at stake. A man of blameless moral life, he was of too cold and phlegmatic a temperament ever to be kindled by the fire of genius: into this divine region he was unfitted to soar, because he was deficient in the force and grandeur of a great moral purpose.

We find that we require to give a short

résumé of a part of our past financial history to explain the part Sir Robert took and carried out in this most difficult subject. For fuller details than we can afford to give, we refer our readers to Doubleday's "Financial History of England," and the late James Wilson, M.P.'s writings, extracted from the "Economist," and published in 1847 separately—both works well worthy of perusal.

The great continental wars this country became engaged in led to a suspension of our specie payments in the year 1796, which were not resumed again until the year 1819. So that for a period of about 23 years all specie payments were legally suspended. During all this time, or interval, the Bank of England note was inconvertible, or rather more correctly, non-convertible, into its equivalent in gold; gold coin and bullion being at a premium ranging between 25 to 30 per cent.,

as compared with the same denominator of value expressed in bank notes. The bank note, although a representative instrument of a certain expressed value, with a promise to pay on demand, became a bill having the legal privileges of deferring the actual payment to a future and indefinite date. The premium given was a discount on it, varying with the varying prospects or chances of ultimately being redeemed in gold by the Bank, whenever it resumed specie payments. And this is, and ever will be, the case. When a national suspension of specie payments takes place in any civilised country having a mixed currency, the standard value as such is entirely altered, or rather there are two standards of value—one in non-convertible paper, and another in gold or silver.

During the recent civil war in the United States of America this was the case, where

the range of fluctuations was from 20 to 100 per cent.; and now, owing to the great resources and the able, acute, and talented financialists of that great and flourishing country, the premium on gold is down to 5 to 7 per cent., with every prospect in a year or so of specie payments being again resumed.

The case is different with Brazil, where for many years they have had a non-convertible paper currency. The millrea in Portugal, where they have specie payments, is equal to about 52 to 53 pence sterling. In Brazil it was long at only 28 pence, and during the Paraguayan War it was at onetime only worth 14 to 16 pence. Now, owing to peace, it has risen to 24 to 25 pence per millrea for English Exchange, the premium on gold fluctuating in a similar ratio.

So much, then, for a non-convertible paper currency.

During all the time we had this in England—for about 23 years—the usual periodic revulsions, commonly called a crisis or a panic, in the Money Market occurred. But by the re-establishment of specie payments in 1819 it was foolishly supposed that we had got rid for ever of the advent of such troublesome recurrences. But the oncoming of a dire, dreadful, and disastrous crisis and panic in 1825 and 1826 dispelled the baseless and romantic dream of the great financialists of that day. To effect a cure for this state of things once and for ever, behold ! a bright and original idea occurred to these regulators of our currency : that was, at once and suddenly to interpose a law to abolish, within a short and limited time, all notes below five pounds of the Bank of England, which was thought at that time to be a sure and safe cure for financial revulsions and crises.

This measure, it must be confessed, gives

a very wide and secure metallic basis to the English currency, keeping a large store of gold within the country in active circulation. But experience has from time to time proved that the hopes founded on this measure were fallacious. Hence it became necessary to reconsider the whole question, and endeavour to solve the problem *de novo*.

The result was, after extensive enquiry and long meditation, the introduction of the late Sir Robert Peel's great Bank Act of 1844. Now, what were the objects he had in view, and those who acted with him, in passing this celebrated measure which remains active law as he left it?

It was principally to prevent the Bank of England from issuing notes in excess of her capital and the necessary wants and demands of trade and commerce. During the suspension of cash payments by the Bank, in all, or

nearly all, the discussions on the subject of currency from 1810 to 1819 it was taken for granted, almost without any clear examination, that the principal cause of great fluctuations in commerce and in financial affairs, producing revulsions of credit (*i.e.* crises and attendant panics) were due to the capricious expansions and contractions of the circulation of the Bank of England, whose action was paramount, and is so from its long establishment and great prestige.

Sir Robert Peel's Bill provided that the Bank shall circulate on fixed securities a sum not exceeding fourteen millions (£14,000,000), made up of eleven millions (£11,000,000) of debt due by the Government, bearing interest, and the balance, three up to four millions (£3 up to £4,000,000), and that the issues beyond that amount shall vary precisely as the amount of bullion varies. So

that with a stock of twenty-four millions (£24,000,000) of gold coin and bullion the bank of issue hands over to the banking department bank notes to the value of thirty-seven to eight millions. As, however, the active circulation of the country, on the average, takes up no more than twenty-four to twenty-seven millions, there is, on the average, left in the banking department a reserve of, say, ten to twelve millions of notes. This reserve of notes, of course, varies with the influx or efflux of bullion; and according to this import or export of gold the rate of bank discount ranges from a minimum of 2 up to a maximum of 10 per cent., and this generally within an interval of a decade.

This, then, is briefly the outline in its main features of the Act of 1844, still in active and daily existence, under which our currency is sought to be regulated.

The same principle has been, by an Act 1845 (in part, at least,) introduced into Scotch and Irish banks. Their average circulation, as it existed in 1845, became, as it were, a fixed quantity; and for all above this, they are obliged to hold in reserve gold to the full value of their notes in excess, in active circulation, and in the hands of the Public.

After long consideration the standard measure of gold was fixed at £3 17s. 10½d. sterling per ounce, or at £46 14s. 6d. per lb. weight, or £467 5s. per 10lb. weight in gold, and obliging the Bank of England by law to exchange or convert its notes at the option of the holder, and on demand, into gold of equal or equivalent value. Sir Robert Peel was under the impression, that when once this act was law, that owing to its skilful contrivance with its automator, or self-acting or self-regulating principles; it would nearly,

if not almost prevent, or greatly modify all future commercial revulsions, *i.e.*, crises or panics in the Money Market. But these hopes were vain and fallacious, for he lived to see the ruin, havoc, and disaster caused by the great crisis of 1847, when the Bank Act of 1844 had for a time to be suspended to prevent the Bank stopping payment of its notes in gold, and thus involving not only the Bank but the English Government and the country in failure and ruin; and thus for a brief time the principle of convertibility of the bank note has been placed in abeyance: the Bank was therefore allowed by a Government Order in Council to issue notes quite irrespective of the amount of bullion held in stock, not only for the crisis of 1847, but the precedent has been copied and repeated in the panics of 1857 and 1866, showing that there are higher laws in their recurrence, than what

was taken into account by the late Sir Robert Peel, or those who have hitherto legislated upon our currency regulations and laws. That higher law that he so strangely overlooked, was the one of periodicity, and it is to this important aspect of it we desire to draw attention. It is then this periodical recurrence of event that characterises a general financial crisis that claims especially our consideration. Its appearance is not however to be confounded with a trade (or even a Stock Exchange) panic in a particular staple article; the temporary or daily market price from a short supply or excessive demand has risen *pro. tem.* above its average value (or cost of production) from all becoming buyers; soon a reaction ensues, prices are driven down from a maximum to a minimum rate by all becoming sellers, and a trade panic in that special trade—stock, funds, or shares—ensues,

confined to that particular branch of speciality.

With a financial crisis the conditions are more complex, by no means so easy of exposition or explanation, the antecedents of which may extend over a number of previous years, without giving much apparent warning of its advent, except to those who from long experience or shrewd and earnest study become aware that a financial storm or hurricane is about to burst upon the affrighted commercial classes; this too without any definite warning, which renders its incoming all the more dangerous and ruinous to those engaged in commerce. Sufficient attention and prominence has not been given previously to the periodicity with which such crises in the Money Market recur, pointing clearly to their latent or visible connection with a cycle of seasons, which apparently run their course within every decade, winding up every tenth year

or thereby, clearing the commercial atmosphere by a financial storm or hurricane that sweeps almost everything before it, expending its fierceness and its fury upon the fortunes, the affairs, and wellbeing of mankind, producing a revulsion in credit, in faith, and in confidence, which takes a considerable time afterwards to re-establish, to build up, and consolidate.

We think it is now time this subject was considered more deeply, treated of more in detailed facts, boldly and courageously faced, and a solution found if possible for a highly important question, whose recurrence exercises such extensive influence on man and his actions and wellbeing.

This only can be done, we think, by endeavouring to arrive at some general principle which acts as an over-ruling law, as a cyclical recurrence of seasons in the nature of things mundane.

CHAPTER V.

THE LAW OF MEAN AVERAGES IN THE MONEY
MARKET.

THE periodical revulsions that almost invariably occur in the Money Market, known as financial crises, are brought about by a variety of proximate causes, and it is in these near and apparent causes that are held generally as the one efficient cause of the ruin and disaster which take place within certain definite times. But as we go deeper into the matter, it will be found, we think, that it is owing to a cycle of seasons having run their course, that there is brought round a state of affairs which culminate in one of those periodical revulsions known as a financial

crisis, with its attendant panic ; thus arising from a higher law than has hitherto been fully taken into account, which the more visible and apparent features of each crisis cannot explain, far less elucidate the patent and prominent fact, that they now recur at definite periodic times, and this usually within a decade or every tenth or eleventh year or thereby.

This points to the conclusion that we have to seek for the real cause in a regular recurrence of a cycle of seasons, repeating as it were their course every tenth year or thereby, or within that decade of time.

We are strongly supported in this view of it, that each decade in its parallel years presents many commercial phases almost alike, if not, indeed, identical ; this too, even although commerce has made such gigantic strides and progress during the last fifty years, and

financial science has grown up as a great and vital system.

Let us, therefore, analyse these last fifty years, taking the undernoted years as follows :—

YEARS, VIZ. :

1820	}	Each of these years respectively were nearly, or in a great measure, marked by a general recovery from a stagnation of commercial operations, superinduced by the undernoted years :—
1830		
1840		
1850		
1860		
1870		

YEARS, VIZ. :

1817	}	Each of these years respectively were marked by dire and disastrous crises in the financial or money market, leading to panics, and ruin to bankers, merchants, manufacturers and others engaged in commerce.
1826		
1837 & 38		
1847		
1857		
1866		

All confidence and credit in men and things was so severely shaken and destroyed in these

previous panic years, that during the under-noted years it may be said it did not exist:—

YEARS, VIZ.:

1818 & 1819	}	Each of these years respectively were characterised by a slow <i>drieck</i> , and protracted recovery to a convalescent state of soundness, after the previous years of crises as noted above.
1827 to 1829		
1839		
1848 & 1849		
1858 & 1859		
1867-8 & 1869		

YEARS, VIZ.:

1821	}	These years were characterised respectively by a more marked and decided progress to a sound and wholesome state. The effects of the previous panics were wearing away with the accompanying distrust and want of confidence. They were years of revival in which commercial stagnation begins to give way to a recommencement of business enterprise.
1831		
1841		
1851		
1861		
1871		

We have in the following undernoted years

three of the most prosperous years in each decade :—

YEARS, VIZ. :

1822-3 & 1824	}	As here noted, we have a range of three full years in each decade when commercial enterprise was in vigorous and healthy action ; and as we have had this in the past, we are safe to assume that we shall experience the same likewise in 1872-3 & 1874* ; at least, we venture this as a scientific prediction, as being one of the results of our investigation.
1832-3 & 1834		
1842-3 & 1844		
1852-3 & 1854		
1862-3 & 1864		

Again, in the undernoted years following those above mentioned :—

YEARS, VIZ. :

1825	}	We have years of decided overtrading and great commercial reaction arising from the three pre-
1835 & 36		
1845 & 46		
1855 & 56		
1865		

* The above was written during the years 1872 and 1873.

ceding years having been, or supposed to have been, prosperous and favourable to commercial progress and enterprise, the result of which overtrading and great extension of speculation—tending to press upon the financial resources of the country, already strained to the uttermost—raises the price and value of loanable capital; along with this, about these very years, we have the advent of a cycle of bad seasons, turning the foreign exchanges against this country, with a somewhat sudden drain or efflux from the stock of gold coin and bullion held by the Bank of England, as in the years under-
noted :—

YEARS, VIZ. :

1826

1837 & 1838

1847

1857

1866 & 1867

} It is during these years the
above causes operate in an accu-
mulative manner, and produce an
overwhelming financial crisis, accompanied

with a commercial panic and collapse. It has been usual to note these years, as thus:—

1826, &c., as a crisis brought about by Foreign

Loans and Mining Speculations, &c.

1837 & 1838, ditto, called the great American
Panic, &c.

1847, as the great Railway Panic and Irish
Potato failure.

1857, as the great Western Scottish Bank
failure, &c.

1866, as the Overend, Gurney, & Co. failure,
&c.,

with hundreds of Limited Liability Companies, and newly-started Banking Companies, &c.—bankers and speculators going down in one “grand *melée*” of ruin and disaster.

We shall now arrange and systematise these years, in a tabular review of periodic events or occurrences, as noted on next page:—

Decade.	No. of Years in Decade.	Years of Financial Crisis and Commercial - Panic.	Years of great Depression and General Stagnation.	Years of Slow Recovery from Depression and Stagnation.	Years of decided Recovery from Commercial Depression.	Years of very Prosperous and Remunerative Commercial Enterprise.	Years of Over-trading and great Commercial Reaction.
1	10	1816	1817 1818 1819	1820	1821	1822 1823 1824	1825
2	11	1826	1827 1828 1829	1830	1831	1832 1833 1834	1835 1836
3	10	1837	1838 1839	1840	1841	1842 1843 1844	1845 1846
4	10	1847	1848 1849	1850	1851	1852 1853 1854	1855 1856
5	9	1857	1858 1859	1860	1861	1862 1863 1864	1865
6	10	1866	1867 1868 1869	1870	1871	1872 1873 1874	1875 1876 1877
		60 Yrs					

As thus displayed in the above tabular form, this periodicity of similar events, occurring at almost regular intervals of time, deserve more enquiry and attention than has hitherto been bestowed upon them. When at all noticed, they have been generally dismissed with the superficial remark that they are mere coincidences or concurrences in our financial, commercial, and social system, working out their results under the law of action and reaction.

We have already seen in our short summary that it was the opinion of the late Sir Robert Peel and those who acted with him, that these dire and disastrous disturbances in the Money Market were due to improper or imperfect legislation in regard to the laws in currency and banking, or in the regulations thereof. But the last Act of 1844 for England was supposed to embody a scheme so

skilfully contrived as almost to be self-acting in its main principles, tending greatly, if not altogether, to overcome the effects of these crises and panics in financial affairs; but alas! in its action it has not proved so, for the Act has been found—and this, too, quite by accident—to mitigate the intensity of these periodical crises by being for a time suspended, as it was in 1847, 1857, and in 1866 by a special Order in Council.

We think, if a cause was sought for in tracing out an almost regular recurrence of a “cycle of seasons” in each decade we have indicated, we consider this would throw considerable light on those hitherto unexplained phenomena that have been a puzzle to many financialists and other enquirers into this subject—this complex one.

As we have said, this cyclical recurrence of seasons appears to have a range between each decade of ten or eleven years or thereby;

if, therefore, this is the case, we ought to be capable of tracing out this as a law in the value of loanable capital in the Money Market, as represented by the current rates of interest, or, rather, rates of discount charged by the Bank of England. This we find to be the case, as, however much the rate may vary from day to day, we have an almost invariable average rate within each decade as specified, as the following table will show. We convert the fluctuating daily rate into an average rate for each year, as *averages* are alone of value in scientific enquiries; and it is owing to so very little being done in the collection and verification of averages, that, as a science, our subject is in so backward a state.

For the purpose we have in view, we borrow from the Bank of England upon Government Securities the sum of ten thousand pounds at the daily current Bank of

England minimum rate, as published by the Directors, and in an account current which will be found herewith we arrive at the following results as the annual average amount of interest due as under:—

INTEREST TABLE NO. 1.

AMOUNT OF INTEREST ON £10,000 STERLING FOR 20 YEARS, 1848
TO 1867 INCLUSIVE, AT THE CURRENT BANK OF ENGLAND
RATES.

Average Amt. of In- terest due for year...	Amount. £ s. d.	Average Amt. of In- terest due for year...	Amount. £ s. d.
1848	372 1 0 $\frac{3}{4}$	1858	322 17 6
Ditto	1849 294 13 1 $\frac{3}{4}$	Ditto	1859 281 1 10 $\frac{1}{2}$
Ditto	1850 250 13 8 $\frac{1}{4}$	Ditto	1860 446 11 5 $\frac{1}{2}$
Ditto	1851 300 0 0	Ditto	1861 522 6 5 $\frac{3}{4}$
Ditto	1852 215 6 10 $\frac{1}{4}$	Ditto	1862 258 9 9 $\frac{1}{2}$
Ditto	1853 369 9 0	Ditto	1863 440 10 9 $\frac{1}{4}$
Ditto	1854 512 17 6 $\frac{1}{2}$	Ditto	1864 735 12 0 $\frac{1}{4}$
Ditto	1855 474 4 10 $\frac{1}{2}$	Ditto	1865 477 7 9
Ditto	1856 558 15 3 $\frac{1}{4}$	Ditto	1866 696 8 8 $\frac{1}{4}$
Ditto	1857 666 14 1 $\frac{1}{2}$	Ditto	1867 229 0 9
First Decade.....	4014 15 6 $\frac{3}{4}$	Second Decade...	4410 7 1 $\frac{1}{4}$
		First ditto	4014 15 6 $\frac{3}{4}$
			£8425 2 8

If we take the preceding Interest Table No. 1, and reduce these annual average amounts of interest to their per centum amounts (per £100 sterling) per annum, we arrive at the following results:—

INTEREST TABLE NO. 2.

ANNUAL AVERAGE AMOUNT OF INTEREST PER CENTUM (PER-
£100), BEING THE AVERAGES OF BANK OF ENGLAND RATES.

Average Amount due per £100 for year.....			Average Amount due per cent. for year.....		
Amount. £ s. d.			Amount. £ s. d.		
1848	3	14 5	1858	3	4 7
Ditto	1849	2 18 11	Ditto	1859	2 16 2
Ditto	1850	2 10 0	Ditto	1860	4 9 2
Ditto	1851	3 0 0	Ditto	1861	5 4 4
Ditto	1852	2 3 0	Ditto ..	1862	2 11 7
Ditto	1853	3 14 0	Ditto	1863	4 8 2
Ditto	1854	5 2 7	Ditto	1864	7 7 2
Ditto	1855	4 14 6	Ditto	1865	4 15 4
Ditto	1856	5 11 9	Ditto	1866	6 19 3
Ditto	1857	6 13 4	Ditto	1867	2 5 9
40 2 6			44 1 6		
Average rate for this Decade per cent....			Average rate for above 10 years...		
£4 0 3			£4 8 1		

If we take the first decade from 1848 to 1857, we have a general average for these ten years of about 4 per cent. for Bank of England rate of interest, and for the following or second decade, 1858 to 1867, we have likewise an average rate of interest of £4 8s. per cent., being an exceedingly small increase considering the great derangement of our foreign exchanges during the Civil War in the United States, which is very ably expounded by the Right Honble. G. J. Goschen.

M.P., in a work on the Foreign Exchanges—a work well worthy an attentive perusal.

If we make a careful comparison between these two decades, we see very striking features of a similar kind. It must be borne in mind that these tables are framed upon averages, made up from the daily current rates; the calculations are all made up on a sum of ten thousand pounds, so as to bring out an accurate result.

In the first decade we have six years below the general average rate and four years above it, viz., a minimum average of £2 3s. per cent. for the year 1852, and a maximum average of £6 13s. 4d. for the year 1857; while the *current* rate ranged from 2 per cent. in 1852 up to 10 per cent. in 1857.

We have here an interval of five years between the lowest and highest rate.

Again, if we take the second decade from

the year 1858 to 1867 we have five years below the general average rate and five years above it; the minimum average is £2 11s. 7d. per cent. in 1862, while the maximum average is £6 19s. 2d. per cent. in 1866; while the *current* rate ranged from the lowest, viz., 2 per cent. in 1862 up to 10 per cent. in 1866. We have here an interval of four years; no doubt the rate was a fraction higher in 1864, but this was owing to the very high price of cotton, acting, as we have said, upon the foreign exchange; but this high rate did not produce a crisis in the Money Market, because the cycle of seasons had not run their course by that year, nor had it done so indeed in 1866; but owing to the unfortunate failure of Overend, Gurney & Co., and many other limited liability companies, the crisis and panic wrought itself out in 1866, although not due by our calculations until 1867.

Table of Minimum and Maximum Years of Average Rates of Bank of England Interest, as under :—

FIRST DECADE.

1848 TO 1857.—10 YEARS INCLUSIVE.

Minimum Years.				Maximum Years.			
	£	s.	d.		£	s.	d.
1848	3	14	5 per Cent.	1853	3	14	0 per Cent.
1849	2	18	11 „	1854	5	2	7 „
1850	2	10	0 „	1855	4	14	6 „
1851	3	0	0 „	1856	5	11	9 „
1852	2	3	0 „	1857	6	13	4 „
5) 14 6 4 „				5) 25 16 2			
Min. Avr....	£2	17	3 for 5 years	Max. Avr. ...	5	3	3 for 5 years.
				Min. Avr. ...	2	17	3 for 5 years.
				2) 8 0 6			
				Gen. Avr. ...	4	0	3 for 10 years

SECOND DECADE.

1858 TO 1866.—10 YEARS INCLUSIVE.

Minimum Years, as under.				Maximum Years, as under.			
	£	s.	d.		£	s.	d.
1858	3	4	7 per Cent.	1861	5	4	4 per Cent.
1859	2	16	2 „	1863	4	8	2 „
1860	4	9	2 „	1864	7	7	2 „
1862	2	11	7 „	1865	4	15	4 „
1867	2	5	9 „	1866	6	19	2 „
5) 15 7 3				5) 28 14 2			
Min. Avr. ...	3	1	4 for 5 years.	Max. Avr. ...	5	14	10 for 5 years.
				Min. do.....	3	1	4 for 5 years.
				2) 8 16 2			
				Gen. Avr. ...	4	8	1 for 10 years.

A comparison of these two decades brings into prominent notice the working power of that higher law of an almost invariable average, occurring within each decade as specified, and thus, as it were, overruling the currency arrangement or Bank Act of 1844 by an Imperial control, the full sway of which is alone to be found in a cyclical recurrence of seasons, whose periodic times upon further investigation, we apprehend, will yield a satisfactory solution to many hitherto unexplained problems in financial and economic science.

CHAPTER VI.

THE LAW OF MEAN AVERAGES IN THE CORN
MARKET.

THERE are none of the great staple articles in commerce which exercise a more decided and prominent effect on the well-being of any European country than corn; when the supply is abundant and prices are moderate, its effect in stimulating industry and production are two well known to be here repeated; when it and of course other kinds of grain are in scarce and short supply and prices high, its power to arrest industry and check developments of well-being are equally well known and understood; moreover, one of its best known effects is the manner it acts upon the

Money Market. It is in this aspect that it has to us a most important bearing ; it has generally been a moot point with many economists whether the price of money (*i.e.* the value of loanable capital) controls the price of wheat, or that the price of wheat controls the price of money (*i.e.* rate of Bank discount).

Practical men—bankers, merchants, and others—well know the close relations that exist between the two ; at times, when things are quiescent, they are overlooked, at others, and when financial troubles loom in the distance, they become vital and all absorbing questions, not only in the attention they receive, but the anxiety with which they are studied becomes quite intense and overpowering. The relationship between the two has, speaking in commercial parlance, been called action and reaction ; these phrases, good in themselves, explain little in a satisfactory way to those

who wish to make a closer study of their interconnection and to arrive at more definite views thereon.

The mere current rate of grain, fluctuating from day to day, is usually taken in times of extreme pressure upon the Money Market into account, and attention is fixed on it and it alone; while it is the general average price which has for us and our inquiry a full and true scientific value. It is not a little strange that in this respect averages have been so greatly overlooked by nearly all economists.

We have great public departments of State to collect and publish statistics in great profusion, but look over them for averages and you are bitterly disappointed. This is owing to the heads of these departments being men of little scientific acquirements or philosophic culture, or the results would be very different in many points of view.

The under-noted Table gives the official General Annual Average Price of Wheat for Four Decades, that is forty years inclusive :

1st Decade.			2nd Decade.			3rd Decade.			4th Decade.		
Price			Price			Price			Price		
Years.	pr	qr.	Years.	pr	qr.	Years.	pr	qr.	Years.	pr	qr.
	s.	d.		s.	d.		s.	d.		s.	d.
1828...	60	5	1838...64	4		1848...50	6		1858...44	4	
1829...	66	3	1839...70	6		1849...44	6		1859...43	9	
1830...	64	3	1840...66	4		1850...40	4		1860...53	1	
1831...	66	4	1841...64	5		1851...38	7		1861...55	6	
1832...	58	8	1842...57	5		1852...41	0		1862...55	5	
1833...	53	1	1843...50	2		1853...53	0		1863...44	9	
1834...	46	2	1844...51	3		1854...72	7		1864...40	4	
1835...	39	4	1845...50	9		1855...74	9		1865...41	10	
1836...	48	9	1846...54	9		1856...69	2		1866...49	11	
1837...	55	10	1847...69	5		1857...56	5		1867...64	5	
	559	1		599	4		540	10		493	4
	or			or			or			or	
Annusl Average			Mean			Mean			Mean		
for 1st Decade.	55	10	of 10			of 10			of 10		
2nd ditto ...	59	11	years...59	11		years...54	1		years...49	4	
3rd ditto ...	54	1									
4th ditto ...	49	4									
	4)	219 2									
Mean average	54	9½	of 40 years as above.								

These averages being the mean average for each decade, are not very much different from

each other, when the whole range of 40 years is taken into account with the great and extensive alteration introduced by legislative enactment into the laws affecting the importation of corn and grain into this country ; great as these changes have been, we still have here sufficient evidence to prove that a law exists tending to produce a mean, or almost invariable average in each decade ; so far proving that here we have an outcome of that greater law of a cyclical recurrence of seasons which controls the average price of wheat and other grain within every tenth year, showing, too, a maximum and a minimum return. Moreover, we have, within each decade five years below the mean average and five years above it, not altogether in consecutive years, as the following tables will show.

Table of Five Years Above and Five Years Below the mean average in each decade, as under :—

FIRST DECADE.

1828 TO 1837, 10 YEARS INCLUSIVE.

Maximum.		Minimum.	
Years.	Price per qr. s. d.	Years.	Price per qr. s. d.
1828.....	60 5	1833.....	53 1
1829.....	66 3	1834.....	46 2
1830.....	64 3	1835.....	39 4
1831.....	66 4	1836.....	48 9
1832.....	58 8	1837.....	55 10
5) 315 11		5) 243 2	
Mean...	63 2 of 5 years.	48 7 }	Mn. avr.
		63 2 }	55s. 10d.
		2) 111 9 of 10 yrs.	

SECOND DECADE.

1838 to 1847, 10 YEARS INCLUSIVE.

1838.....	64 4	1842.....	57 5
1839.....	70 6	1843.....	50 2
1840.....	66 4	1844.....	51 3
1841.....	64 5	1845.....	50 9
1847.....	69 5	1846.....	54 9
5) 335 0		5) 264 4	Mean of 5 years.
Mean...	67 0 of 5 years.	52 10	
		67 0	
		2) 119 10	
		Mean...	59 11 of 10 years.

THIRD DECADE.

1848 TO 1857, 10 YEARS INCLUSIVE.

Maximum.		Minimum.	
Years.	Price per qr.	Years.	Price per qr.
	s. d.		s. d.
1853.....	53 0	1848.....	50 6
1854.....	72 7	1849.....	44 6
1855.....	74 9	1850.....	40 4
1856.....	69 2	1851.....	38 7
1857.....	56 5	1852.....	41 0
	<u>5) 325 11</u>		<u>5) 214 11</u>
Mean...	65 3 of 5 years.		42 11 of 5 years.
	<u>65 3</u>		<u>65 3</u>
			<u>2) 108 2</u>
		Mean...	54 1 Average of
			<u>10 years.</u>

FOURTH DECADE.

1858 TO 1867, 10 YEARS INCLUSIVE.

1860.....	53 1	1858.....	44 4
1861.....	55 6	1859.....	43 9
1862.....	55 5	1863.....	44 9
1866.....	49 11	1864.....	40 4
1867.....	64 5	1865.....	41 10
	<u>5) 278 4</u>		<u>5) 215 0</u>
Mean...	55 8 of 5 years.		43 0 of 5 years.
	<u>55 8</u>		<u>55 8</u>
			<u>2) 98 8</u>
		Mean average...	49 4 of 10 years
			<u>49 4</u>

SUMMARY OF THE FOUR DECADES.

FIVE YEARS MAXIMUM.		FIVE YEARS MINIMUM.		MEAN DIFFERENCES.	
	s. d.		s. d.	s. d.	
1st Decade...	63 2	1st Decade...	48 7	14 7	
2nd "	67 0	2nd "	52 10	14 2	
3rd "	65 3	3rd "	42 11	22 4	
4th "	55 8	4th "	43 0	12 8	
4) 251 1		4) 187 4		4) 63 9	
<u>62 9</u>		<u>46 10</u>		<u>15 10</u>	
		<u>62 9</u>			
		<u>109 7</u>			

Mean Average..... 54 9½ of 4 Decades.

EXTREME MAXIMUM.		EXTREME MINIMUM.		EXTREME MEAN DIFFERENCE.	
Decade.		Decade.			
1st Year 1831...	66 4	1st Year 1835...	39 4	27 0	
2nd " 1839...	70 6	2nd " 1843...	50 2	20 4	
3rd " 1855...	74 9	3rd " 1851...	38 7	36 2	
4th " 1867...	64 5	4th " 1864...	40 4	24 1	
4) 276 0		4) 168 5		4) 107 7	
<u>69 0</u>		<u>42 1</u>		<u>26 10</u>	
Extreme Maximum Mean Average...		Extreme Minimum...		<u>69 0</u>	
				<u>111 1</u>	

Mean Average.... 55 6 of 4 decades.

We therefore see that, amid all the fluctuations, the price constantly tends towards a mean or general average rate—this, too, within each decade we have specified, as the

preceding tables will show—and in this respect is acted on by a cyclical law of seasons, recurring, as far as we can as yet investigate, within every tenth year or thereby, which is the same law which tends to determine the mean average value of loanable capital in all Money Markets, as we have seen by the preceding section on this subject.

When prices of corn are at moderate figures in this country, there is little or no inducement for the merchants to import the article, nor are they much guided in their views and operations by any consideration as to the mean general average, which for our purpose is all in all in a scientific point of view. No, the daily market rate fluctuating from day to day is to them the guide of their operations, along with the prospects of out-turn of the home crops.

By the abolition of the Corn Laws, and the

rescinding of all duties thereon, it was fully expected that by a steady and regular importation of corn, we would be able to get rid of, or greatly mitigate, the tendency to a catastrophe and crisis in the Money Market.

But these hopes and expectations, held out by the members of the late Corn Law League, have by no means been realised. The great power an unexpected and sudden demand for an extensive importation of corn, consequent upon the failure of our home crops, generally exerts upon the Money Market is almost too well known to be here again repeated, disturbing as they do the international foreign exchanges, causing a large exportation of gold coin and bullion to be transmitted abroad in payment, which almost immediately raises the Bank of England minimum rate of discount under the operation of the Bank Act of 1844.

It is owing to the restrictive character of this measure that an importation of corn, under the circumstances as detailed above, has such an effect of producing a catastrophe or crisis, bringing the whole fabric of credit into a collapse and universal disaster, as it almost generally occurs that this extensive importation of corn is required towards the end of those years we have specified in our table of decades, or otherwise in those years when great and extensive schemes of overtrading and speculation are afloat, when every shilling of the spare capital of the country for these engagements is fully mortgaged and forestalled. It is under these unforeseen circumstances that the foreign exchanges turn against us; gold coin and bullion flow out; the Bank, as bound by law, finding its reserve of spare notes rapidly diminishing, raises its rate of discount, until it tends up-

wards to the highest point—viz., 10 per cent.

It is well remarked by Mr. Goschen, in his work on the “Foreign Exchanges,” as follows:—

“It may be said that an advance in the rate of interest has been spoken of as if money could artificially be made dear. But the fact is that where a considerable efflux of specie is taking place, the rate of interest will rise in the natural course of things.

“At the same time the actual export of bullion is a loss to the money of the country, and the import of gold from abroad replaces that which has been lost. In both cases that which will effectually bring the gold from abroad, in the most general and practical sense, will be the opportunities offered by a high rate of interest to effect profitable and attractive investments.

“For this reason foreign capitalists rightly

attach great importance to the variations of the Bank of England minimum, regarding them correctly rather as indications of the changing value of money than as the results of an attempt to control its price."

"Being acquainted with the influences which are proved to determine the fluctuations in question in the 'Foreign Exchanges,' we are enabled by a reverse process to argue back from them to the existence of their determining cause, and to consider them in their peculiarly valuable character as an unerring mercantile and monetary barometer. But they are more than this. Not only do they offer to the trading community the means of ascertaining the state of the commercial atmosphere, indicating when the air is charged with a storm, or when fair weather is likely to set in ; they so clearly point to the

disturbing currents that their study and due comprehension suggests the course by which danger can be avoided, and moderate the precipitate action of panic."

It is therefore generally in this state of things that the mercantile community are caught at, or towards the end of our specified decades ; when their heaviest liabilities are outstanding they endeavour to cover them at all hazards by forced sales of funded property, both home and foreign, shares, securities, goods, or other property, or borrowing capital at enhanced rates of interest, and soon find almost all things unsaleable and incon-vertible into money. Collapse and revulsion to all kinds and forms of credit sets in ; confidence and faith in men and things is entirely shaken—

" Hope for a season bids the world farewell ; "

and all things mundane suffer alike in one widespread scene of ruin and disaster,

“Circling round the globe from pole to pole.”

Slowly but surely time works out her cure for this melancholy state of things. Commerce, although oftentimes sick, never dies. Time, Nature's best restorer, brings round a more healthy state of affairs. The *vis medicatrix naturæ*, the curative powers ever inherent in Nature, come into full play, not only in a physical sense, but truly in a moral one. Thrift, industry, economy, self-denial, take the place of previous waste, idleness, extravagance, and commercial pride.

It is the same process that so soon restores a country devastated by ruthless war. It may be apparently ruined and destroyed by a fearfully destructive and widespread war, and seem hopelessly sunk, never to rise again ;

but man's powers of destruction are, even in war's most cruel and fiendish form, ever limited ones. Nature's recuperative powers put forth their never-failing energy, and soon a restoration ensues, as we have seen in the civil war in the United States of America, and will, doubtless, see in France, as she emerges from her unparalleled disasters in her late Germanic war.

Mr. John Stuart Mill has some very good and excellent remarks on the great rapidity of countries recovering from a state of devastation, and the disappearance in a short time of all traces of mischief done by earthquakes, floods, hurricanes, and the ravages of war, and alludes to "*the vis medicatrix naturæ*," a valuable term used in physiology, expressive of the curative powers inherent in human nature, but was first applied to economic

science by the celebrated Dr. Thomas Chalmers, as remarked by Mr. Mill, who very justly speaks of him, "as one who has always the merit of studying phenomena at first hand, and expressing them in language of his own, which often uncovers aspects of truth that the received phraseologies only tend to hide."

The restorative process of which we speak is generally a slow and tedious one, apparently testing and trying to man's patience and powers of human endurance, and becomes a moral probation of the most valuable description, teaching to many moral lessons which out last a lifetime.

The restoration is aided by a moderate rate of bank interest, and generally the prices of corn are much below their average, as the following tables will show :—

Table of Annual Average of Bank of England Discount, and same for price of wheat as under :—

FIRST DECADE.

Year	Wheat. Price per qr.		Rate of Discount per cent.	£ s. d.		
	s.	d.		£	s.	d.
1848	50	6		3	14	5
1849	44	6		2	18	11
1850	40	4		2	10	4
1851	38	7		3	0	0
1852	41	0		2	3	0
1853	53	0		3	14	0
1854	72	7		5	2	7
1855	74	9		4	14	6
1856	69	2		5	11	9
1857	56	5		6	13	4
10) 540 10				10)	40	2 6
54 1				4 0 3		

Year	Wheat. Price per qr.		Rate of Discount per cent.	£ s. d.		
	s.	d.		£	s.	d.
1858	44	4		3	4	7
1859	43	9		2	16	2
1860	53	1		4	9	2
1861	55	6		5	4	4
1862	55	5		2	11	7
1863	44	9		4	8	2
1864	40	4		7	7	2
1865	41	10		4	15	4
1866	49	11		6	19	3
1867	64	5		2	5	9
10) 493 4				10)	44	1 6
49 4				4 8 1		

These tables and the preceding ones, convey an amount of information which has not hitherto been collected and arranged and made use of (so far as known) by previous writers on this subject. They are of far more value than appears at first sight, as they are alone capable of yielding a solution of the question, or allow us to lay hold of a great general law at work in the nature of things.

Dr. Adam Smith, justly called the founder of our science, was too acute and profound a thinker not to have got a sort of prophetic insight into the play and operation of this law, for in a remarkable passage, which is the key-stone to much of his and subsequent writing, he remarks as follows :—

“ The quantity of every commodity brought to market naturally suits itself to the effectual demand.

“The natural price (as distinguished from the market price), therefore, is, as it were, the central price, to which the prices of all commodities are continually gravitating. Different accidents may sometimes keep them suspended a good deal above it, and sometimes force them down even somewhat below it. But whatever may be the obstacles which hinder them settling in this centre of repose and continuance, they are constantly tending towards it.”

Dr. J. R. McCulloch, commenting on the above, remarks as follows :—

“The principle laid down as to the natural price of commodities, and that the market price is perpetually gravitating towards it, and cannot, generally speaking, ever diverge considerably from the natural price or cost of production, is equally true and important.”

In “The Philosophy of Trade,” a work by

Mr. Patrick J. Stirling, he makes on this topic the following remarks:—

“Corn, as we have already said, has a market as well as a natural price. So likewise in the law which regulates the natural and ordinary rate of interest. But the market and actual rate is sometimes higher, sometimes lower, than the natural or ordinary rate.”

The last author we shall quote from is Mr. James Stuart Mill on this subject. In his “Principles of Political Economy” he says:—

“Adam Smith and Ricardo have called that value of a thing which is proportional to its cost of production its natural value (or its natural price). They meant by this the point about which the value oscillates and to which it always tends to return. The centre value towards which, as Adam Smith expresses it, the market value of

a thing is constantly gravitating; and any deviation from which is but a temporary irregularity, which the moment it exists sets forces in motion tending to correct. On an average of years sufficient to enable the oscillations on one side of the centre line to be compensated by those on the other, the market value agrees with the natural price, but it very seldom coincides exactly with it at any particular time. . . .

“While thus ruling the oscillations of value, they themselves obey a superior force, which makes value gravitate towards cost of production, and which would settle it and keep it there, if fresh disturbing influences were not continually arising to make it deviate therefrom.”

So far as we can make out (or known to us) the above doctrine was not altogether original. Traces of it will be found in the

previous schools both of the Italian and French economists.

To Adam Smith, however, belongs the rare merit of enouncing it in clear and unambiguous language, such only as a man of his profound and far-seeing genius could do ; giving it, at the same time, a prominent place in his work, which it well deserved from its great importance. But, while he did this, and did it well, as an abstract proposition, he stopped short of any formal or practical, or concrete exposition of the same. He brought it not to the test of any actual experience. What he has thus left undone has been left likewise by his eminent disciples, expositors and commentators. One and all of them, almost without exception, repeat much in the same strain his powerful remarks thereon ; but seeming content with this, or little more, no attempt is made to bring it to the test of

a practical scientific exposition, which we have long known it to be capable of, and been much surprised at the subject in this aspect of it being so long overlooked and undeveloped by those far more competent to deal with it than ourselves.

For it holds, we think, the same place and rank in economic and financial science as the Newtonian law of gravitation does in physical astronomy. It is the great central truth which binds the whole as a science together into a consistent and harmonious system.

It may yet be the means of establishing it in certain departments as one of the exact sciences, thus raising it from the vague and abstract into one more practical and certain than has hitherto been done or attempted.

CHAPTER VII.

BULLION AND GOLD COIN AVERAGES IN THE
BANK OF ENGLAND.

It was our full intention to have compiled tables of the annual mean averages of the gold coin and bullion held in store by the Bank of England for the two decades (1848 to 1867); corresponding with those which we have done for bank rate of discount (*i.e.* interest), but we now prefer to wait until this is done by the bank officials themselves; for to undertake this ourselves the cost in time and trouble would by no means be small; still as it would be a very interesting labour we would not unwillingly undertake it, but the difficulty of getting the returns in a workable

shape obliges us to postpone this task. Moreover, we prefer rather to infer and assume that it will present the following features when it is compiled, viz., that each of the two decades in question will respectively show an almost identical average when made up—that five years or thereby in each decade will be above the mean average and five years below it, that is, five years will be a maximum and five years a minimum return—being based on the same general law as we have shown to be at work in over-ruling and determining the rate of bank discount; for as the rate of interest (*i.e.* discount) is based upon and alters with the fluctuations recorded in the stock of gold coin and bullion, so, likewise the stock of gold coin and bullion will conform to the law of averages which has been exhibited in our preceding tables of bank rates of interest.

It may here be noted that the efflux and influx of gold coin and bullion is more strictly acted on whether the foreign exchanges are favourable or unfavourable to this country, and fluctuate accordingly; this, no doubt, is the case, and if the variations in our foreign exchanges were duly recorded, and a mean annual average struck, the financial information they would give would be most invaluable.

The weekly returns of gold, as published by the Bank, only require to be added up for the whole year and divided by the number of the weeks given; this would give the average held during the year, and the ten years as specified would give the average for each decade, and we infer that the two decades will show a very close approximation to one another; when this is done they will doubtless yield another proof in support of our ex-

position. Moreover, we have been surprised that such a return has not been long ere this published, either by the Bank officials or others, adding another example how much in this mercantile country the subject of averages have been so long neglected and overlooked.

CHAPTER VIII.

A CYCLE OF SEASONS AS INDICATED
BY THE RAINFALL.

FEW or none can plead ignorance as to the oft-repeated phrase of a "cycle of seasons," as heard in common parlance, but few if any have sufficiently pondered on its deep significance, or of its latent meaning, of the great importance to arrive at what the celebrated Master of Trinity College, the late William Whewell would call "true and appropriate ideas, so as to come to clear, concise notions thereon." This then is what we shall endeavour to do in this chapter.

Although a cycle of seasons is so frequently assumed either in writing or conversation,

it is not a little strange that with so general a presumption in its favour, no effort worthy of name has been made—so far as known to us—to give it a true and satisfactory basis.

The subject in this aspect is by no means free of difficulties, the data to establish it upon such a foundation is not easy to be laid hold of.

It is vague in general, so scattered here and there, that to collect, to systematize, and to generalize from it the necessary law of a periodicity in the outcome of a cycle of seasons, is indeed a problem of very difficult solution.

We have made an attempt in our section on the mean annual prices of wheat for four decades (*i.e.* forty years) to show that we have a periodical recurrence of a similarity of season within every decade (*i.e.* ten years);

to some, the proof here offered may seem sufficient, while to many the conclusion drawn may not rise to a full demonstration of the law we seek to confirm and establish beyond a cavil or a doubt thereon.

Were we merely to depend on the exposition we have given in a previous chapter we would candidly admit we were ourselves dissatisfied with the proof thereanent offered.

Under these circumstances then, we are glad to be able to offer a much stronger body of evidence in support of the proposition, which to our subject is of a vital and all embracing importance; this then we proceed to do by showing that a recurring cycle of seasons is indicated by the rainfall, which, when fully investigated, shows that we have in each decade (*i.e.* every 10 years) an almost invariable average of rainfall in each locality or district.

We have as it were a decennial law of rainfall, that is the rainfall for any given place repeats itself every decade, or every ten years, in almost invariable averages, having a higher or lower range of average, whether on the East or West sides of Britain, beginning and ending within certain periods, thus clearly defining as with a sunbeam, the law of periodicity in the rainfall.

To make much progress in this branch of our enquiry, the collected returns of the rainfall must extend over a long series of years unbroken; few are the rainfall stations where such returns can be procured, and of such accuracy as can be depended on.

Fortunately the returns of rainfall at the Royal Observatory, Greenwich, extend over upwards of fifty years unbroken, and they are invaluable to illustrate the ground-

work of that general law which underlies, if it does not control a great deal of the phenomena otherwise inexplicable which we are giving an exposition of.

The returns of the rainfall at the Greenwich Royal Observatory, kindly communicated by the Astronomer Royal, we give in a table as under, arranged in specific decades :—

TABLE OF RAINFALL, AS UNDER.—No. 1.

1st Decade.			2nd Decade.			3rd Decade.			4th Decade.		
Years.	Inches.	Tenths.	Years.	Inches.	Tenths.	Years.	Inches.	Tenths.	Years.	Inches.	Tenths.
1828	31	5	1838	23	'8	1848	30	'2	1858	17	'8
1829	25	2	1839	29	6	1849	23	9	1859	25	9
1830	27	2	1840	18	3	1850	19	7	1860	32	0
1831	30	8	1841	33	3	1851	21	6	1861	20	3
1832	19	3	1842	22	6	1852	34	2	1862	26	5
1833	23	0	1843	24	6	1853	29	0	1863	19	8
1834	19	6	1844	24	9	1854	18	7	1864	16	8
1835	24	9	1845	22	4	1855	21	1	1865	28	6
1836	27	1	1846	25	2	1856	22	2	1866	30	1
1837	21	0	1847	17	8	1857	21	4	1867	28	5
	249	'6		242	'6		242	'0		246	'3
Mean Annual Average ...	24	'9		24	'2		24	'2		24	'6

Table of Five Years Above and Five Years Below the Mean Average in each Decade, as under:—

FIRST DECADE.

1828 TO 1837.—10 YEARS INCLUSIVE.

Maximum.			Minimum.		
Years.	Inches.	Tenths.	Years.	Inches.	Tenths.
1828	31	'5	1832	19	'3
1829	25	'2	1833	23	'0
1830	27	'2	1834	19	'6
1831	30	'8	1835	24	'9
1836	27	'1	1837	21	'0
5)	141	'8	5)	107	'8
Mean Maximum	28	'3 of 5 Yrs.	Mean Minimum	21	'5 for 5 Yrs.
				28	'3
			2)	49	'8
			Mean Average	24	'9 for 10 Ys.

SECOND DECADE.

1838 TO 1847.—TEN YEARS INCLUSIVE.

Maximum.			Minimum.		
Years.	Inches.	Tenths.	Years.	Inches.	Tenths.
1839	29	'6	1838	23	'8
1841	33	'3	1840	18	'3
1843	24	'6	1842	22	'6
1844	24	'9	1845	22	'5
1846	25	'3	1847	17	'8
5)	137	'7	5)	105	'0
Mean Maximum			Mean Minimum	21	'0 for 5 Yrs.
of 5 Years.....	27	'5		27	'5
			2)	48	'5
			Mean Average	24	'2 for 10 Ys.

RAINFALL TABLE, CONTINUED.—No. 2

THIRD DECADE.

1848 TO 1857.—10 YEARS INCLUSIVE.

Maximum.			Minimum.		
Years.	Inches.	Tenths.	Years.	Inches.	Tenths.
1848	30	'2	1850	19	'7
1849	23	'9	1851	21	'6
1852	34	'2	1854	18	'7
1853	29	'0	1855	21	'1
1856	22	'2	1857	21	'4
5) 139 '5			5) 102 '5		
Mean Maximum			Mean Minimum		
for 5 Years .. 27 '11			20 '5 for 5 Yrs.		
			27 '11		
			2) 48 '4		
			Mean Average... 24 '2 for 10 Ys.		

FOURTH DECADE.

1858 TO 1867.—TEN YEARS INCLUSIVE.

Maximum.			Minimum.		
Years.	Inches.	Tenths.	Years.	Inches.	Tenths.
1860	32	'0	1858	17	'8
1862	26	'5	1859	25	'9
1865	28	'6	1861	20	'3
1866	30	'1	1863	19	'8
1867	28	'5	1864	16	'8
5) 145 '7			5) 100 '6		
Mean Maximum			Mean Maximum		
for 5 Years ... 29 '1			20 '1 for 5 Yrs.		
			29 '1		
			2) 49 '2		
			Mean Average 24 '6 for 10 Ys.		

RAINFALL TABLE, CONTINUED.—No. 3.

Extreme Maximum.				Extreme Minimum.			Dif- ference.
1st Decade.	Year...	Inches.			In.	In.	
	1828	31 '5		1st D. Year	1832	19 '3	12 '2
2nd	"	1841	33 '3	2nd "	"	1847	17 '8
3rd	"	1852	34 '2	3rd "	"	1854	18 '7
4th	"	1860	32 '0	4th "	"	1864	16 '8
		4) 131 '0				4) 72 '6	(4) 58 '4
Extreme Maximum.....		32 '7		Extreme Minimum	18 '1	14 '6	
		18 '1					
		2) 50 '8					
		25 '4					

When we carefully examine the preceding table of the rainfall, No. 1, we find very important and interesting results, showing the law to be an almost invariable mean average within each decade, as specified. Again, when we turn to table No. 2, we find we have in each decade five years as much above the mean annual average, as we have five years below the same, in almost a like proportion; while, if we take the extreme maximum and extreme minimum years in each decade, we have what we may term a minor law of almost invariable difference.

The following will show the difference, computed in tons, of rain per acre; each inch of rainfall near to, or about the sea level is nearly equal to 102 tons of water in weight per English acre, so that the

Average maximum would be equal to 3,264 tons per acre ;			
Average minimum	„	„ 1,836	„
Average difference	„	„ 1,428	„

These figures will better convey to our readers a clearer idea of the great and important difference between a year's rainfall above the mean annual average of about 2,448 tons, per English acre, and below it. Of course it is the rainfall that causes us to have a wet or dry season, which has such a great effect on the out-turn of our home crops of grain, which in a great measure determines the current price of wheat, and ultimately the general mean average price for the year.

In this manner the rainfall controls the price of wheat and other grain to a very great extent. Moreover, we have seen that the same great law of periodicity applies to both, in the mean general average result that each respectively works out within specific decades.

Of course in the full establishment of this law of rainfall there emerges the almost similar correlative law of barometrical pressure and its enumeration of atmospheric disturbance and change, with its periodic recurrence of winds, storms, and hurricanes, the scientific results of which, when collected and verified, will, doubtless, show us the existence of such a law, as there is inductively analogical proof that the one proves the existence of the other as a natural consequent.

It is to these natural laws to which Job alludes in a remarkable passage: "God looketh

to the ends of the earth, and seeth under the whole heaven; to make the weight for the winds; and He weigheth the waters by measure. When He made a decree for the rain, and a way for the lightning of the thunder, then did He see it, and declare it: He prepared it, yea, and searched it out."

CHAPTER IX.

VITAL STATISTICS, INDICATING A CYCLE OF
SEASONS.

THE state of the general health, normal and abnormal, as is generally summarised under vital statistics, is, as is well known, greatly acted on for better or for worse by the rainfall, or by wet or dry seasons. It is only within the last fifteen years, however, since the new Act to collect and verify such statistics has come into full force, that it is beginning to yield invaluable results in tracing the causes of disease, thus guiding and directing the efforts to counteract the same. But the period has been as yet of too short a duration to give us a comparison of one

decade with another in this respect; were we in possession of this, we should find the cycle of seasons give out, doubtless, almost similar results or ratios of nearly identical enumerations.

It would thus in time yield us a vast insight into one of the most interesting questions in practical philosophy, viz., the difference between contingent and necessary truth, what more contingent to each individual than disease and death, and at what age death may take place in each separate case. No human provision can so forecast these events as to arrive at any certainty in regard to them in this respect; but take these events in the mass as recorded in well ascertained statistics, group them under their proper headings, and their total particulars, when summed up, give out almost invariable similar results, specific ratios of certain

definite proportions from year to year; they have, when taken as a whole, passed entirely from the contingent, the accidental, the uncertain and vague, into the region of the positive, the fixed, the almost immutable, and much of the present apparent discrepancy that so mysteriously puzzles our Registrars General in reporting on our annual vital statistics would, we are confident, nearly disappear if each decade could be brought into a scientific comparison with the preceding one.

So well aware are these accomplished compilers of statistics of the state of the season on the general and special conditions of health that now they invariably accompany their reports with a statement of the rainfall, and the indication of the temperature, as registered by the thermometer, and the atmospheric weight or pressure registered by

the barometer, showing in their view and opinion how close and paramount is the connection between these conditions as acting on the districts over which their reports extend.

But how interesting, important, nay, invaluable, would it be if two or three recurring cycles of seasons could be compared with one another ; what great insight would be gained into what at present we can only perceive is the strong, nay, almost 'invariable, tendency of these and many kindred subjects to rise from the contingent into necessary and invariable ratio of mean averages or results.

Thus it has been, and ever may be, the individual is environed with the contingent, the uncertain, the mutable ; they are in all cases the surroundings of our personal lot in life, be our educational adjustments what

they may be, either natural or acquired, or both combined. Still no forecast can validly be made of our future, our destiny, our fate in life.

Dr. James McCosh remarks, "This uncertainty, meeting us everywhere, appears more especially in those departments of God's works with which man is intimately connected. As we come closer to man, the elements of uncertainty become more numerous. How uncertain are all the events on which man's bodily and external welfare depends! He is dependent on the weather, and it is so variable that its changes cannot be anticipated. And yet is it scarcely more capricious than the whole course of events, prosperous or adverse, arising from his fellow-man, or from Nature, on which his whole earthly destiny depends."

Bishop Butler was wont to say, "That probability was the guide of life." But rising

in our view from the individual to the mass, from the atom of humanity to its collected and generalised aggregate, we leave the contingent behind us, and ascend into a region of necessary truth, nay, almost mathematical truth and certainty in the recorded vital statistics of a country or a nation.

Bearing the tenor, then, of these remarks closely in mind, they have an important bearing on our exposition of the averageological law of interest, of grain, and of the rainfall, which we have endeavoured to give. It is only by treating them in the form and under the conditions we have there exhibited, that out of them we can ever arrive at such results as can be truly called scientific; this term we use in the sense of being the expression of a generalised experience of the past, capable of being used as the exposition

of a law on the nature of things, concisely summed up in a short, terse, but expressive aphorism, easily retained by the mind as a key to knowledge, capable, too, of being exhibited in a scheme or table of contents and numbers, upon which the mathematician may deduce such formula as raises the problem from contingent into necessary truth. But science does more than this—if she correctly generalises the past, she can truly predict the future, for like conditions give like results.

It is thus, and thus only, science is true to her avocation. Her temple is indeed the Temple of Truth; upon her shrine her votaries must lay no oblation that is not consecrated to the true; otherwise it will yield no blessing to the mass of humankind. It will cease to be to them “a guide, philosopher and friend;” for as a great thinker has

finely said, "Truth, like a torch, the more its shook it shines."

It is surprising how deeply a belief in a cycle of seasons has run through almost all ages and nations, and yet no modern determined effort has been made to get to the bottom of this belief, or the foundation on which it rests. The Chinese cycle extended over sixty years, &c.

The Registrar-General for Scotland, in his Annual Report for 1861, published in 1865, makes the following weighty remarks:—

"It has been found when investigating the phenomena of the natural world, that most things have a tendency to return in *cycles of longer or shorter periods*. The above facts would seem to show that the same is probably true of disease. When the phenomena of disease shall be more carefully studied, it will probably be also at the same time found that

diseases spread like waves, gradually creeping over the country, exactly as storms do. This fact has been distinctly traced with regard to epidemic cholera, and is probably true, more or less, of all epidemic diseases. For instance, the epidemic class of diseases attained their maximum mortality in England, in 1858, while in Scotland the maximum was not attained till the following year, as if the epidemic wave took nearly a year to travel northwards from the south of England to the north of Scotland.

“Medical observation has to a large extent confirmed the truth of the results which have been deduced from the facts above referred to ; for it has been often observed that the diseases termed epidemic, of whose propagation by contagion not a trace appears for a considerable period, seem in other years to change their nature, so that they not only

spread by reason of their unknown epidemic agency, whatever that may be, but also to a considerable extent by contagion."

So far as we have as yet been able to collect observations on this medical question of disease, it seems to appear that within every decade we have epidemics ranging over a three years course of duration or thereby, such as are classed under the category of zymotic disease. They usually present the general feature that on the first year of their outbreak they are very virulent, often very malignant, on the second year much less so, and on the third year they decline and gradually disappear and die out; this was the case with small pox in 1851 and 2, 1861 and 2, and now, 1870 and 71; and so with other classes of zymotic disease having a like course of three years or so duration, such as measles, scarlatina, typhus fever, influenza, &c.,

having, however, different years of commencement, crisis, and decline, showing thus clearly a periodicity of recurrence within every ten years or thereby. It is in this way, we apprehend, that we may be able to get a clue to the somewhat obscure phenomena of epidemic disease, and when it alters from this and developes into a contagious character, or becomes localised as of an epidemic type. To do this effectually and lay the foundation of epidemiology as a science, would require a medical philosopher with the mental power and genius of a Dr. Cullen; however, a commencement has been made by Professor Tyndall's experiments and researches into the germ theory of organisms in the air which bids fair to lead to important results in this respect.

It is somewhat in like manner that we have in each decade three years of excessively cold

winters, often accompanied with excessive fogs, three years of very hot summers, three years of excessive storms and hurricanes during the equinoctial changes of the seasons ; while in the East Indies a cyclone bursts forth within every ten or twelve years' interval.

“ The periodical recurrence of famines may be regarded as established, so far as the Madras Presidency is concerned, beyond all reasonable doubt. The statistical department which Lord Mayo called into existence some years ago has been laudably active in the matter ; and the officer who presides over it, Mr. W. Hunter, has lost no time in collecting and tabulating the available figures which throw light on the laws that appear to govern the rainfall, and consequently the harvests, in that part of the world. The Government Astronomer at Madras is a strong adherent of the theory, propounded

at the beginning of the century by Sir W. Herschel, that some correspondence exists between the phases of solar maculation and terrestrial phenomena such as rainfall, heat, prevalence of cyclones, terrestrial magnetism, unusual displays of the aurora borealis, &c. The same view is taken by the Government Astronomer at Mauritius; and the fact of cyclones being especially prevalent at the maximum period of sun spots, and especially rare at the minimum period, is now, we understand, fully recognized by underwriters in undertaking risks in Indian Seas."

CHAPTER X.

CONTINGENT VERSUS NECESSARY TRUTH REVIEWED AND CONTRASTED.

As it has an important bearing on the scope and tendency of our exposition to convey to the general reader not fully conversant with the distinction we have noted above, a few remarks further thereon may render our meaning all the more clear and unambiguous.

Speaking generally, the leading abstract propositions of what are called Political Economy may be said to belong to the domain of contingent truth; that is, they may, or may not, be a correct exposition of the truth they profess to give; in point of fact, the latest modern writer of note confesses as much.

Somewhere in his writings, John Stuart Mill calls them "truths in the rough," and a more apt, correct, or expressive phrase he could not have adopted; for however true they may be, and rendered so after an endless amount of discussion, they are still left, in a measure, open to dispute; they lack the great elements of a clear, consistent certainty; they afford no valid demonstration of the truth they profess to contain; hence, as a science its slow, uncertain progress—the great dissatisfaction felt that it has not kept pace with the advancement of kindred sciences. In this respect it presents an exceedingly poor appearance with modern science generally. This has not arisen from it having been neglected; quite otherwise, for great attention has been devoted to its cultivation since the days of Adam Smith until the present; even now there are greater signs of its more extensive culture by the rising generation.

Neglected or overlooked by some of the Universities, they are now making arrangements to establish chairs and professorships to provide regular lectures and prelections to their students on this subject, along with mercantile law, customs, and usages.

From these and other signs we consider it is now full time an effort was made to raise it from the position of the contingent into the domain of necessary truth. It is for this purpose we have endeavoured to frame the exposition we now give: here, however, let us not be misunderstood. It is only to certain vital points we have made the application—a vast field of the subject, from want of properly compiled data or statistics, cannot be thus treated. Upon it we have no wish at all at present to enter, having quite sufficient on hand to deal with. We have thus confined ourselves to the averageological law

of bank discount or rates on loanable capital, of grain, and of the rainfall—all subjects, whose data, if taken from day to day, are environed with the contingent, the accidental, the uncertain; but if treated under the law of averages, they all alike rise from this class into the category or domain of necessary truth, capable of exhibiting their past results in a table of contents, which show a great similarity in their main features, as if the same general law was at work to produce these nearly identical results.

“As if through all things one great purpose runs,
Widening with the circle of the suns.”

As we have attached much importance to averages in our discussion as to the accuracy they afford us in our investigation, a few words here upon averages will not be out of place. They are of the utmost scientific

value, when properly given and framed ; they embrace the numerical expression of both the positive and negative poles ; they give the mean of the fluctuation occurring between a minimum on the one side, and a maximum on the other. They are more than this, for they quantify on the one hand and they qualify on the other. It is well known how rapid has been the progress of chemical science under the twofold conditions of a quantifying analysis and, at the same time, a qualifying one of the various products submitted to its investigations and researches.

Nor has the practical common sense of mankind been slow to take advantage of working out results in action by means of averages. As, for instance, what more difficult or dangerous undertaking could be gone into than that of sea insurance by those who, as underwriters, take upon themselves such

hazardous, such dangerous risks as insuring the safety of ships or their cargoes, afloat or at sea. This, too, is quite safely and profitably done, by doing it upon a uniform average of a fixed sum upon each individual risk—neither less or more.

We remember well some years ago, when some new Marine Insurance Companies commenced they, in their gross ignorance of the law of averages, took indiscriminately risks ranging from £300 up to £4,000, without ever attempting to equalise them by any re-insurances with other offices. These false and foolish modes of carrying on their business operations, in a very few years involved the concerns in ruin and disaster, winding up with great loss to the shareholders and directors.

It is upon the principle of averages that the great and important transactions of life

insurance are carried on so safely, so beneficially to all concerned. What more uncertain or mutable than any one sole individual life? yet when aggregated together, or grouped under the general number within specific ages, tables are framed of the relative value of life at all stages, which form a sound, solid, scientific basis, upon which life insurance rears its beneficent altar for the best interests of a suffering humanity.

To the agriculturist who cultivates the soil, what can be more uncertain than the seasons in their changeableness, upon which he depends for the outcome of his crop, for a return for his invested capital, time and toil. If he has been wise, and been able to get the usual long lease of his farm, generally granted in Scotland, of nineteen years, variable as the Scotch climate is, he can calculate with much safety upon a profitable return,

both upon his crops as well as his improvements made in the soil and its cultivation. It is owing greatly to these long leases that Scottish agriculture is in so advanced a state. It is difficult to say how so beneficial a custom arose of granting a lease of land to the Scottish farmer of nineteen years; but this is the exact term of a lunar cycle,* that is, the moon during one-half of this time is in the ascending node, and for the other is in the descending node. Here we have nearly a course of two decades, over which the law of averages has sufficient time to work out its beneficial results for both landowner and tenant.

Strange to say, during all the vast body of information and discussion on the Irish Land

* The celebrated Meteorologist Luke Howard, attempted to found a Cycle of Seasons upon the "Lunar Cycle" of nineteen years, as stated above, but this was found to be a mistake, and not a success.

Bill in 1870, hardly anyone threw any new light on this question from the above point of view. The system of tenant at will, or yearly tenant in Ireland, has always been a gross injustice, and led the way to tenant right in the soil for unexhausted improvements; and will do so likewise in England at no distant day, owing to the short term for which land is let for in that country. It does not permit the tenant to receive the due advantages he is entitled to receive from the working out of the law of averages within each recurring decade.

One of the most successful of all the financial companies lately incorporated under the Limited Liability Companies Act, has been one where the funds have been invested in the purchase of foreign government bonds of good dividend paying stocks, founded upon an average of the different stocks they pur-

chase. The company having adopted this sound, safe principle, is paying a good dividend, and in time coming is likely to continue to do so.

CHAPTER XI.

METEOROLOGICAL SCIENCE.

IN the course of this exposition, we have had to briefly consider this branch of our subject therein. We have had to restrict our remarks to the rainfall with its bearings on the other parts of our enquiry; this, too, without branching into other aspects of a science still in its infancy, seeking amid the most mutable, unstable, or variable of all elements for laws to forecast the weather. Much has been done to popularise the forecasts of winds and storms by the late lamented Admiral Fitzroy. Much more requires to be done before any amount of certainty can be attained therein. The rainfall is receiving

considerable attention, but the data or returns are seldom to be met with spread over lengthened periods; or if so, are either defective or cannot be relied on for the purpose we have in view. But the returns of the rainfall kept at the Royal Observatory at Greenwich are and have been admirably kept, thus they are all that could be wanted or desired.

By the kindness and the courtesy of the Astronomer Royal, Sir George B. Airey, C.B., we have from time to time been supplied with these invaluable returns. Having in 1866 published a short preliminary article thereon, Professor Sir George Airey had the goodness to favour us with the following communication :—

“ Your letter of the 12th instant, with your article, were both received. It appears to me that the recurrence of averages of 10

years proves little. If you had used 12 or 15 years, I do not doubt that the averages would have been found very accordant. What we want is the succession of large and small numbers in each period. If you can show that, that the succession is the same in the different periods, you will have made a good point."

These remarks deserve attention from the eminent position of the writer, who is one of the very first astronomers in Europe, having devoted a long and honourable life to the prosecution and advancement of this noble science. He is somewhat correct in saying that if we had used 12 or 15 years he does not doubt the averages would have been found very accordant, but this is to press against us the very strength of that law—that the rainfall for longer or shorter periods tends towards invariable averages. Moreover,

it is only in averages of ten years that each decennial average agrees with the mean average for 40 years ; adopt 12 or 15 years, and their mean are either above or below the general mean of 40 years. This we have tried, to satisfy ourselves—according to the second paragraph of his communication ; we have since its receipt supplied a succession of large and small numbers in each period—that this is the same in each decade. We have thus made good the point he requires, but as yet this has not been submitted to him.

We are thus particular in noticing the strongest argument that can be brought against the positions we have been at some pains to establish. Our best thanks are due to so eminent an authority as the Astronomer Royal for so kindly pointing it out to us. We were, however, aware of it as a weak point,

and were somewhat prepared for its being pressed against us by scientific writers of the present day.

It has been fully noticed that where extensive alterations in the surface of the land had been going on for a series of years by man's action or interference—such as renewed cultivation, drainage, cutting down timber, &c.—the usual rainfall has a tendency greatly to alter in its character. This is what we might naturally expect.

We are well aware our efforts in this division of our subject are merely tentative, requiring more prolonged and deeper researches than we have as yet given to this part thereof; still, we offer it as a contribution towards a more exhaustive investigation, which we hope to overtake upon some subsequent opportunity. We much regret that nothing has as yet been

done towards a collection of the returns of the rainfall in other countries than our own. Internationally, this enquiry is full of scientific interest; in time, too, it must yield the most valuable results.

CHAPTER XII.

METEOROLOGY AND ITS CONNECTION WITH OTHER SCIENCES.

WE have thus endeavoured in the preceding sections of our subject to expound as it were a new system upon which we think financial and economic science can be more readily, more practically, more clearly apprehended than in the various works which treat upon these subjects; not, indeed, do we suppose we can ever displace or supersede those various works, marked with so much acuteness, information, and historical research. But we consider every aid or light is necessary, not only to advance these sciences but to extend a knowledge of them

among all engaged in the mercantile careers of the present age.

The effort has been made to bring it more into harmony with the inductive method of treatment, thus seeking by this process to arrive at some understood, some well-defined law or principle in the nature of things, which, if accurately developed, should enable us to sum up by generalisation our past experience; tabulating the same in annual mean numerical values, which the celebrated Alexander Von Humboldt thus considers as the ultimate results of all the higher scientific investigations.

In the "Cosmos," he says—"In all that is subject to motion and change in space, the ultimate aim, the very expression of physical laws depend upon *mean numerical values*, which show us the constant, amid change, and the stable amid apparent fluc-

tuations of phenomena. Thus the progress of modern physical science is especially characterised by the attainment and rectification of the mean values of certain quantities. And it may be truly said that the only remaining and widely-diffused hieroglyphic characters still in our writing—*numbers*—appear to us again as powers of the Cosmos, although in a wider sense than applied to them by the Italian school.”

So likewise we have the deliverance of an equally great authority on this very subject. “It is the character,” says Herschel, “of all the higher laws of nature, when scientifically developed, to assume the form of a precise quantitative statement and form.”

So much, then, for the past. If we have arrived at a true principle—the detection of which we are fully warranted in applying, without any charge of prophetic presumption

upon the same or similar basis, to hazard as a scientific prediction the probable course of the present decade from 1868 to 1877 inclusive—which, so far as it has run, has in a great measure presented almost similar features to preceding decades, showing a system of parallelism running through nearly all of them that we have endeavoured to exhibit in a table previously given—we are thus saved making a repetition of our views in this part of our subject; our readers are, therefore, fully taught what in our opinion will be the likely course of events. Nor, indeed, on general grounds, is the doctrine altogether new to those versed in these subjects, and practically acquainted therewith; the more experienced, the more shrewd, and far seeing have for themselves, and themselves alone, in many cases generalised this as a rule or law, upon which they

act and carry on their operations. Hence it is we have in these walks of life men commencing from small beginnings, in time becoming merchant princes, capitalists, or millionaires. To them, and others like them, the knowledge of this law of parallelism running through each decade is, when acted upon, the real philosopher's stone at last found—like Midas of the ancients, whose touch turned everything to gold: while to the many—also too many young and inexperienced—the want of this knowledge and shrewdness is a mean, or one of the means, of landing them in ruin and misfortune—or, as the word truly means, fortune missed. So well did the Romans know this, that they always represented Fortune as a blind goddess—a word that means ignorance as well.

While therefore in the above sense, the doctrine is thus partially and practically

known in a vague and misty way, strange to say no persistent attempt has been made to find for it a true scientific basis, which although generally held to be in accordance with the nature of things, has not met with the attention or investigation its importance demands.

This general presentiment of knowledge thus vaguely held, is by no manner of means to be confounded with such embodiment of knowledge when clearly and systematically laid down.

Hitherto we have treated our complex subject in a plain and prosaic manner, so as to make it easily to be understood by those who may even for the first time give their attention to such a theme; for this purpose we have kept clear of much of that technical language which lends so much force and precision to scientific exposition. Moreover

we have confined it exclusively to its bearings on a mundane view of things as being so far confined to our globe or earth; as a law, having its existence or rule here and here alone, rather than emanating from a higher source, or traceable to a loftier source; here we might be content to leave it to work out its own redemption, to vindicate its own reality, to stand the test of discussion and criticism if favoured with such; or the best of all tests—the test of time. But, alas, the enigma of a decadal or decennial law, working out in things mundane a parallelism of events or effects, every recurring decade would still be an unsolved problem, although they could not contradict or controvert it as a fact, or withdraw in actuality themselves, or their affairs from its iron grasp, and its inevitable results.

To such a question, which very naturally

arises, we answer in the affirmative; a very distinct trace of it can be found, we think, and have long thought so, in the phenomena of the stellar and solar systems; the data or observations for this are so incomplete as yet that they do not allow of us dealing with them as certain and positive.

Among the ancients a strong presentiment existed amounting to a belief in such a doctrine, and was known under the name of *Magnus Anni*, or the great year or cycle. It was likewise held during the middle ages by many of the schoolmen; traces of it still exist in India, China, Japan, and even Peru to this day.

Never, perhaps, in the world's history, were seen such brilliant discoveries made in these lofty and ennobling sciences—the astronomical and mathematical—as during the seventeenth century in the time of Kepler, Galileo, of

Tycho Brahe, Copernicus, Huggens, Newton, and Leibnitz. These great and gifted men lived in an age of intellectual giants ; each and all of them strove with might and main to represent by their respective labours the whole of physical astronomy into the true mechanism of the heavens. From their age to the present, the efforts of succeeding astronomers, while greatly extending the boundaries of our knowledge, have likewise confirmed all the leading doctrines taught by these seers and sages of the seventeenth century.

The greatest attention has been given, and never more so than at present, to arrive at correct ideas of the physical constitution of the sun, the centre of our solar system, and above all as to the nature of the sun-spots, which were first discovered in the seventeenth century.

CHAPTER XIII.

SUN SPOTS AND THEIR CONNECTION WITH
A CYCLE OF SEASONS.

THE most important step in connection with sun spots, was taken by Dr. Wilson, the first Professor of Astronomy in the University of Glasgow. By a series of attentive observations made on a large sun spot which appeared towards the close of the year 1769, he was led to the important conclusion that the spots are cavities on the sun's photosphere, and that the penumbra, or perfectly luminous border of the spot, represents in each case, the shelving sides of the cavity. This theory of the sun spots has since been generally adopted by astronomers. According to Sir

William Herschel, the sun is an opaque nucleus, encompassed by two nebulous envelopes : the lower envelope being imperfectly luminous, but capable in a high degree of reflecting the solar light ; the upper envelope on the other hand, or photosphere, being the source of the sun's light and heat. Sir William Herschel shows how the varying phenomena of the spots may be accounted for by rents in these two envelopes.

The next advance in this question was made by Schwabe, a German astronomer, who, by a persevering course of observations of the sun spots, discovered that their frequency on the solar disc recurs in successive cycles of about 11.1 years. General Sabine about the same time, found that the diurnal variations of the magnetic needle are characterised by a period of equal duration.

We thus find what we are in search of,

viz:—a periodical cycle ranging from 10 to 11 years, with a recurrence of equal duration between.

It is now fully known that the sun spots have a very marked influence on our seasons ; they are known to oscillate between a minimum on the one hand and, a maximum on the other.

According to recent and careful observations, the following years were those when the sun spots were at a minimum, viz:—

Years, 1833

„	1843	interval of 10 years	} Average interval of $11\frac{1}{3}$ years.
„	1855	„ 12 „	
„	1867	„ 12 „	

Thus showing a periodical recurrence of the same, or nearly the same interval or space of time, while on the other hand the maximum years were

Years 1836

„	1847	interval of	11	years	} Average interval of 11 years.
„	1859	„	12	„	
„	1869	„	10	„	

Thus likewise showing a periodical recurrence or cycle of an average of about 11 years or thereby. So far as observations go, these sun spots appear to pass from a minimum to a maximum, within the space of three years upon an average, while conversely they pass from a maximum to a minimum within or about a period of eight years, thus showing out clearly a periodic cycle of about 11 years or thereby.

It was the opinion of the celebrated astronomer, Sir William Herschel, that these sun-spots had a decided effect on the changing variety of our seasons, and he made the greatest efforts to connect this with the price of corn, but after great labour, he did not

succeed for want of sufficient observations. This part of the question has been only recently revived by both Professors Balfour and Jevons, in papers on this very subject read before the British Association of Science at Bristol. It will yet require much more to be done and accomplished, before it can be established as a great astronomical law. It is as yet beset with great difficulties to the best scientific men, but who are now pressing forward in this quest with an earnest energy and zeal. It is, however, in this direction that we must look for discoveries that may yield us valuable results, not alone in the distant regions of celestial space, but in affairs mundane.

The action of the stars within our own system, such as Jupiter acting on or causing the sun spots, is still a disputed question among

the 'astronomers, but these again, becoming efficient or known causes, within the domain of meteorology, which we have fully shown, play a very important part in the economic condition of the great commonwealth of nations.

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